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RUDOLF VIRCHOW.

An Address delivered before the Medico-Chirurgical Society of San Francisco.

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Among the names of men who have lived in the nineteenth century, and who are destined to live in human memory, is that of Rudolf Virchow.

Twenty-five years ago I heard an enthusiastic admirer of Virchow say that he would be willing to give five years of his coming life in exchange for one year under the instruction of Virchow. Forty years ago, when attending medical lectures in Philadelphia, I often heard this eminent authority referred to. Nearly twenty years ago I spent over two years in medical and surgical study in Europe, and six months of this time were passed at the University of Berlin, in the class room of Virchow. That the opinion of him just expressed was not, and is not, an exaggerated estimate of the man, I will endeavor to show by a review of what he has written, of what he has done, and of what he is doing.

Most men who have earned distinction have done so by concentrating their energies in one direction; the striking characteristic of Virchow is that he has reached eminence along several lines, and so much so that had his labors been confined to any one of these he would still have made himself famous. Teacher, writer, pathologist, politician, each and all has he been, and in later years he has also been an investigator in anthropology and in archeology.

The medical studies of Virchow were pursued in Berlin, where the great advantage was his of coming in contact with Johannes Müller, from whom he imbibed that inspiring enthusiasm for medicine which has since incessantly animated the receptive student. The reverent love of Virchow for Müller, and the devotion to his memory is shown in the affectionate tribute paid by the pupil to his teacher, or rather to the wife, Sophie Müller, in an address, half apologetic, for certain opinions held by Virchow but not in harmony with opinions held by the Müllers. The hand of the renowned Schönlein, whose eye first caught a glimpse of the acarus scabiei, also contributed its share in the plastic molding of the young Virchow, repaid in after years by the pupil in some memorial pages imbued with affectionate respect.

His successful career as student soon indicated Virchow's fitness as teacher, and he would at once have been given a position in the Faculty of Frederick-William University, had he not at that time developed qualities which have ever since been predominant characteristics, viz., those of active political partizanship. In this role the part he has played has been a famous one, that of opponent to the policy of the Prussian Government; and this adverse position to the ruling power threw so many barriers in his way to advancement that he sought in Bavaria a more friendly field, and there was honored with the Professorship of Medicine in the famous school of Wurzburg, where he had once been a student. Here, too remote from Prussia to be much distracted by her politics, he gave heart and mind to his favorite study—pathology. In this Bavarian school, then the most frequented one in Germany, the young professor had fortunate association with Scherer, the physiological chemist, with Eisenmann, the German leader in internal medicine, and especially with Kölliker, who was greatly widening, if not actually creating, a new department in medicine, viz., the study of the minute or elementary tissues of the human body; in this work, which was chiefly microscopic, methods were pursued closely cognate to those in use for investigations in elementary pathology.

At this period pathology was a field rich in truths awaiting the hand of discovery, although some work therein had been commenced, for observation had noted many facts; yet, these lay without order, in disjointed incoherence, ready for a master-hand to write them in logical sequence and to give them their true interpretation. The leading students and writers in England on this subject were James Paget and John Simon; forty years ago the writings of each of these were familiar to the medical reader. I recall with what impassioned ardor a little group of internes in a New York hospital read Simon's little volume, and how great was our interest in his statement that the manifestations of disease are in obedience to laws as fixed and consequent as are those of health. Some pages of Paget's most excellent English were translated into the language of Celsus by the writer, who was then preparing for his naval surgical examination.

Much pioneer-work had to be done before the pathologist could successfully labor, and this work was the task of anatomy. Anatomical science in a high degree of development was transmitted from antiquity to modern times through the works of Galen. Galen often suffers abuse in the address delivered at the modern medical commencement, an abuse which might be avoided were the speaker to read Galen's wonderful chapters on anatomy. Whoever will take the pains to read these chapters will find in them an almost accurate epitome of the science as it exists in any one of our text-books on the subject, the chief difference being that the modern book lacks the spirit of religion which pervades the pages of Galen. It is time that this tirade against Galen should cease; it began with Paracelsus, who burned the works of Galen in the market-place of Bâsle, and in their stead left his own books, which are a strange medley of stray truths, commingled with religion, astrology, alchemy, and incomprehensible mystery. Instead of Galen's rational anatomy, Paracelsus teaches that the body is composed of three elements—mercury, salt, and sulphur. Besides this elementary trilogy into which Paracelsus sought, by alchemy, to resolve the animal body, if one gropes into his mystic magazine, he finds written there *similia similibus curantur*.

After the luminary of medicine had long been dimmed by mystic occultation, approaching total eclipse, it emerged from these clouds and moved in a more rational orbit; the anatomy of Galen, where in error, was revised by Vesalius, Eustachius, Fallopius, and others, whose researches were honored by inscribing the names of their authors on some part of the human body. Each bone, muscle, nerve, and vessel having been carefully studied, anatomical research appeared complete, when Bichat announced that these structures were susceptible of division into tissues. In the midst of the terrors of the French revolution, in 1801, Bichat gave the medical world his remarkable work on anatomy, in which one finds the first systematic classification of the tissues composing the body. To commemorate his services to medical science, the figure of Bichat is given a prominent place on the front of the Pantheon of Paris.

In its work of analysis, research passed from the tissues to their components; the hand of Bichat opened the way and pointed towards a new world, a world of the "infinitely little," as Pascal names the microscopic field which lies beneath man, in contrast to the immensely great one which lies above and beyond him. The scientific side of medicine soon attracted a host of students; the macroscopists and the microscopists were emulous rivals. In anatomy Henle, of Göttingen, explored every inch of the field, and gave the world a work which defies competition; a book in which the usual description of parts is replaced by one that is wholly new; for instance, his description of the sphenoid and the temporal bones is so singularly original that it clings to memory with unusual tenacity; yet, as lecturer before a class, as I remember him, his slow elaboration of his subject approached tediousness.

Near by, labored the histologists, represented in France by Robin, and in Germany by Kölliker and others, who unraveled the normal tissues and studied their elementary components in their primary state, and in their subsequent growth and changes. Cognate to this analytic study arose that of the science of pathology, in which were first studied those alterations in the coarse anatomical structures and their constituent elements which are caused by disease. A great pioneer in the work of making necropsies, and of observing and recording the changes of structure due to morbid action, was John Baptist Morgagni, who wrote his observations in a famous book named "Adversaria Anatomica," a copy of which I exhibit to you; the title literally signifies the daily jottings of anatomical observation The *Lancet* many years ago adopted as a motto for its section of hospital practice the admirable lines of Morgagni, in which he says, "There is no other certain way to know medicine except to have collected many histories of disease and of *post mortem* examinations of one's own work as well as that of others, and to compare these together."

In this work of Morgagni, and of numerous co-laborers, the pathologist did not reach the nucleus of his subject; he only went as far as his unaided eye could guide him; to follow disease to its ultimate hiding-place he needed the microscope.

The microscope, as indispensable adjuvant in histological and pathological study, came into use slowly. The older generation was content with macroscopy; one generation ago the laboratory and the microscope came into general use. Helmholz, in his address entitled "Thinking in Medicine," refers to the meagerness of such instruction in his student years as follows: "The instruments were dear and scarce; I became the possessor of one in this wise: During the autumn vacation of 1841 I was ill in the Charité Hospital, Berlin; being a student, medical treatment cost me nothing, and so, when I had recovered, I found myself possessor of a small amount of money which I had thus saved. The instrument purchased was not a beautiful one, yet it permitted me to recognize the nervous processes of the ganglionic cells of invertebrate animals, as described in my inaugural thesis; also to see the vibriones mentioned in my work on Putrefaction and Fermentation."

After a few years' connection with the school at Würzburg, Virchow was called to Berlin and made Professor of Pathology in Frederick-William University. During his connection with the Bavarian School, he had made himself a conspicuous figure in the medical world by the publication of an elaborate work, entitled "Handbook of Special Pathology and Therapy." Besides editing this work, Virchow was one of the most extensive contributors to it. This work commences with a volume written by Virchow on "The General Forms of Disturbance and Disease (in the body) and their Ways of Compensation;" in this book the student will find one of the most exhaustive studies of the subject of Inflammation. With the coöperation of a number of the leading medical writers of Germany, this encyclopedic work was continued for several years; among its writers may be mentioned the names of Bamberger, Griesinger, Hasse, Lebert, Traube, and Hebra, each an authority on his subject. In his contributions one catches glimpses of the future Virchow, especially in the chapters on thrombus, obstruction of vessels, and embolism. This encyclopedic work seems to not have reached its completion, although it contains seven large volumes. It has been succeeded by Ziemssen's great publication, of somewhat similar character.

During the publication of the work referred to, Virchow commenced a journalistic publication, entitled *Archives of Pathological Anatomy, Physiology and Clinical Medicine.* In this journal have appeared papers of great merit on these subjects; in fact, the critical censorship of the eminent editor was such, that the appearance of an article in the *Archives* was guarantee of excellence. As one example may be cited the Essay of Ernest Brücke on the Causes of Coagulation of the Blood; a compend of work done in the years 1853, 1854, and 1855, in which he was competitor for the Astley Cooper prize which, from time to time, was awarded by the authorities of Guy's Hospital for original experimental work. The prize was this time awarded to Richardson, although it is probable that Brücke was nearer than Richardson to the correct solution.

In 1851 Virchow became one of the associate publishers of *Canstatt's Jahresbericht*, a review of the progress of medicine in all parts of the world. This work consists of two large volumes, published annually, and contains a compend of what is published in each and every different language, during the preceding year, in every section of medicine. It began in 1841, under the supervision of Canstatt of Ansbach, who, for a time, as a reviewer, took charge of one of the sections. This publication soon passed into the hands of Eisenmann, who, in 1851, chose as collaborators, Schrer and Virchow; to-day the work is under the control of Virchow and Hirsch. Canstatt began the work with a corps of some seventeen assistants, to each of whom was assigned for review one section of medicine; to-day, the work comprises in all one hundred and four large octavo volumes, and has a corps of reviewers, amounting to nearly forty men of eminence in some department of medicine. I may add that, during the last thirty years, the reading of *Canstatt's Jahresbericht* has occupied many of my leisure hours. As a store of knowledge, in which the annual advancement in medicine is arranged in easy referable order, this work stands without parallel or approximate rival; here anatomist, pathologist, surgeon, physician, and specialist, find all the progress made in his department during the last fifty-two years. In each issue the tireless hand of Virchow furnished, for many years, a review of his favorite subject, pathology.

When, in 1856, Virchow was called to Berlin and given the appointment of Professor of Pathological Anatomy in the University of Frederick-William, he was thirty-six years of age, in the prime of physical and mental vigor, and his connection with one of the first German universities offered him opportunity for the exercise of his best powers as teacher, lecturer, and writer. To give him ample sphere for the teaching of his specialty, there was erected, under his supervision, it is said, a large building, near the Charité Hospital, specially arranged for pathological work. This edifice, named Pathologisches Institut, contains one room for *post-mortem* examinations, three lecture-rooms, and a museum in which are stored pathological specimens. The Pathological Institute has been the scene and home of Virchow's great work in medicine.

In the winter semester of 1857 and 1858 this building was rendered famous by the delivery of twenty lectures, in which Virchow elaborated and presented his doctrine of cellular pathology. These lectures, of which there is a good English translation, introduced a new era in medicine. In a style singularly attractive, they gave to pathology a definite and enduring form, depicting the changes which disease impresses on the tissues, the constituent cell being the prime factor in all the morbid processes. The connective tissue, hitherto viewed as an unimportant or inert contingent of animal structure, was, by Virchow, first shown to have most invaluable functions: as an agent of repair, furnishing elements for the restoration to integrity of diseased or injured parts; while, as a neoplastic factor the cell, whether of connective tissue or of epithelial origin, is the leading agent in the development of sarcoma, carcinoma, and other growths. Although subsequent research has rendered necessary a revision of some points of these doctrines, yet, in the main, they stand in integrity, despite the efforts of some who would fain subvert them.

The publication in 1858 of Cellular Pathology, was followed in 1863 by one of equal eminence, The Pathology of Tumors; the latter may be considered as the supplementary completion of the former. The Pathology of Tumors was also delivered, within a period of five months, as a series of lectures to an audience of students and physicians; and only one with untiring diligence and supreme capabilities for work would, as Virchow was then situated, have undertaken such a task. He acknowledges that, without the aid of the stenographer who copied the lectures, the work would have been impossible; for, as he says in the preface, his duties in the Prussian House of Representatives, to which he had been elected, added to those in the University, left him no leisure for a new publication. The work was, however, accomplished, although not completed as the author intended; yet, it will remain as a great, perhaps the greatest, master-piece in this department. It was the embodiment of the researches of twenty years, and of a personal study of tumors in their different forms. To tranquilize friends who were anxious in regard to his overwork, he assured them that his work in the House of Representatives was often a relaxation, requiring less expenditure of force than that of the writer in his chamber of quiet labor. In the preface he emphasizes the importance of accurate observation, and says that only such objective methods of study can truly answer the questions which arise in scientific inquiry. This work is of universal authority; and writers on the subject, whether English, French, Italian, Spanish, or German, never fail to quote from Virchow's Pathology of Tumors.

The labors of Virchow have not been confined to scientific work; he is a friend of popular instruction, and has liberally contributed his quota in that direction. A few years ago, in conjunction with Fr. von Holzendorff, he commenced the publication of a series of addresses in popular form on subjects within the domain of literature, history, medicine, and natural science; to-day the work has reached to nearly the number of seven hundred addresses, and those which have relation to medicine or to natural science have been supervised by Virchow. Although these addresses are popular in character, they have yet been prepared by their learned authors with such care that the educated reader will be repaid for the perusal of any of them. Here, as in other cases where Virchow has been an associate writer or publisher, he has outlived his fellow collaborator; the position of Holzendorff is now filled by Wattenbach. I may remark that the course of public lectures, annually delivered at Cooper Medical College, is somewhat analogous to some of those in the series here referred to. Such lectures, besides giving the public glimpses of the progress which legitimate medicine is making, do still further good in placing within the hands of the people a few hygenic weapons with which to fight the battle of life.

To what has been mentioned Virchow has added other literary work, consisting of memorial addresses, papers on public hygiene, and on topics kindred to Medicine. Here, especially in the addresses on Schönlein, Müller, and Goethe as naturalist, he has given evidence that his pen is at home in a field far removed from the pathological. In speaking of Goethe's recreations in natural science, Virchow says that the nobility of Goethe's character was manifest in the fact that, when tired in the service of his muse, he found content in excursions into Nature's realm of the eternally beautiful and the eternally true. Virchow's Essay on Sickness and Health is delightfully written; that he has faithfully depicted the differences of these conditions, will find affirmative response in the experience of most readers. In the dissertation in which he deals with the mechanical conception of life, the all-important part performed by the cell is told in a most interesting manner, and the subject made plain to the ordinary reader.

Virchow was an active participant in the deliberations of the famous association founded by Oken, named the Society of German Naturalists and Physicians. Before this society he delivered, in 1865, an address, entitled "The Importance of the Natural Sciences; and their Development in Germany," every line of which is illumined with the light of exalted patriotism. This address awakened much feeling; so much resentment did it arouse in the mind of a Russian delegate to the Society, that he arose and left the hall. It was also vehemently attacked by the press of Austria. These occurrences scarcely disturbed the composure of one who had a lance well disciplined in fiercer conflicts in the arena of Prussian politics.

In 1890, when the International Medical Congress met at Berlin, by unanimous consent of the medical profession of Germany, without a challenging rival, Virchow was selected as the one most worthy of the coveted position of presiding over that body; and the chaplet then placed on his brow was stirred by no breath of envy since it had the sanction of the medical men of all nations. The equal of Panum, one of his predecessors, his ear was no stranger to the English, French, and German languages in which the deliberations of the Congress were conducted. Like all learned Germans, he speaks English well.

Virchow's varied talents have found occupation in the fields of archeology and anthropology. A few years ago he spent a vacation on the site of ancient Troy, in company with Schliemann, who was engaged in exploration of the ground rendered sacred by Homer's muse. Virchow soon after published an interesting account of his observations there. In the field of anthropology he is a most diligent student. After the Franco-Prussian war he met M. Quatrefages, a co-laborer in the same science; but national disappointment and the memory of damage by Prussian bombardment to the National Museums of Natural History in the Jardin des Plantes, caused Virchow's former friend to turn coldly from him. As Ulysses learned, when the shade of Ajax turned slightingly away, that the resentments of the dead are eternal, so Virchow learned that the wounds of national pride sting forever.

The visitor to Père la Chaise finds the tomb of La Fontaine surmounted by a monument on which are the forms of the animals which play such a part in his fables. Were a monument to be erected which should typify the various phases of Virchow's intellectual labor, it would be yet more diversified; and to add to that diversity, so striking in the portrait I have given of him, many pages might be written of his career as a politician. The limits of this article, however, will permit but brief reference to this remarkable chapter in his life's history.

By mental constitution Virchow is a controversialist; by precept and by practice he has taught that unless a man, when unjustly attacked, defends himself, he is lacking in duty. Besides the defensive, he has also taken a boldly aggressive part in scientific and in political assemblies, when error or when usurpation threatened encroachment. A recent example of this was a tilt in which his opponent was Haeckel; the latter was advocating the introduction in the text-books for youths of the doctrines of Haeckel in regard to the origin and evolution of organic life. Virchow did not think that the doctrine of animal life and its phenomena, which Haeckel refers to, the spontaneous aggregation of Herr Kohlenstoff (Carbon) and Company, had been well enough proven to be ranged among common truths.

In his political course, Virchow has ever been the champion of popular rights. In the Prussian House of Representatives his voice has often been heard in fearless denunciation of ecclesiastical encroachment and of military absolutism. In 1875, when the church was seeking for alliance with the government, Virchow called the Emperor to account in words which scarcely any other tongue would have dared to utter. He has ever been an unflinching opponent to the military policy of Bismarck; the latter once challenged Virchow to a duel, to which challenge he received the answer, as popular rumor says, that Virchow would accept the challenge of Bismarck when the latter became the peer of the former in morality. In 1875 Bismarck complained of this opposition in terms which reminded one of the peevish whining of the sick Cæsar when he says: "Give me some drink, Titinius, like a sick girl."

One of the noblest efforts of Virchow's intellectual life is an address, delivered only ten weeks ago, before the Royal Society of England. The subject was "The Position of Pathology Among the Biological Sciences." Although delivered from the rostrum where Faraday, Huxley, Tyndall, Buckle, and other representitives of the best intellect of England have stood, no abler address was ever there spoken. It was an offering at a noble shrine of the best fruits of one of the ablest and most thoroughly trained minds within the domain of medicine. In English as polished as his native Teutonic, and with a modesty which is ever the close companion of greatness, in simple, almost impersonal terms, he narrated his services to the science of medicine. This address is so full of learning, so eloquent, and so suggestive in many of its lines, that one who has but once read it, will not be therewith content, but must perforce read it again. To the medical scientist, as well as to the practitioner whose labor is gratuitous or ill-paid, the following quotation from it contains words of cheer: "True happiness is not based on the appreciation of others, but on the consciousness of one's own honest labor. How otherwise should we hold our ground in the midst of the turmoil of the day?" Similar words of Forster, Carlyle, and Emerson have cheered others in hours of unpaid-for and unthanked-for toil.

Virchow has made the whole medical profession heirs of his doctrine, and his lines of work and methods of research have been pursued with especial zeal by some of his pupils—among these may be mentioned Recklinghausen, Wegner, Orth, and Grawitz. As tireless worker and thoughtful investigator, Grawitz most nearly resembles his master.

A little less than twenty years ago I went abroad and spent over two years in study at some of the leading scientific and medical institutions of Europe; the purpose being to enjoy instruction at its prime sources from the lips of the masters. On review I should say that the time most profitably used, was five months spent in hearing a course of eighty-four lectures by Huxley, on Biology, and a semester spent in Berlin, where the time was divided between Langenbeck and Virchow. I registered as a student and took all the courses by Virchow. These were on the following subjects: one course on necropsies, one of lectures on pathology, one of the study of pathological material furnished by all the hospitals of the city, and a fourth course consisting of the microscopic study of pathological specimens. To the microscopic work, six hours daily were devoted, five days of every week, and this amount of time enabled one to pass cursorily over the field and to acquire the rudiments, at least, of pathology.

I first saw Virchow at his practical course in the necropsy-room; he entered in haste, almost breathless, and at once proceeded to his subject. The cadaver, frozen and in a room ice-cold, was examined according to the plan laid down in Virchow's manual entitled "Sections Technik." In the use of his special knife which he called the "pathologist's sword," he displayed wonderful expertness and faultless accuracy. Holding the brain in his hand, he cleaves it in parallel planes, so that it is divided into many thin lamellæ, which, like a book, can be opened and closed at any point, and the whole can afterwards be replaced in the cranium with but little sign of mutilation. Thus proceeding, disease at any point can be discovered. One saw Virchow at his best in his demonstrative course on pathology, given every Saturday. A long series of plates laden with morbid specimens was, one by one, brought along before him, and the special character of each explained. On one occasion the head of a horse that had died of glanders was the specimen chiefly considered; this head sawn through longitudinally so as to present the nasal cavities studded with ulcers, lay for an hour before him, while he discussed the disease of glanders. When the fatal character of the disease is considered, it is evident there was no small risk in thus standing over and breathing the effluvia from such a source of lethal contagion. On another occasion, numerous specimens from a case of variola lay before him while he gave an extended lecture on the disease. This was true courage, the constant endowment of the earnest scientist. During these lectures, the microscopic exhibits, mounted on instruments, were moved along before the students on a miniature railway-track, which was fastened on the desks. When the plate of glanders or of variolous specimens was in circulation, I need scarcely say they made a very brief halt at my station.

This demonstrative course was commenced by directions to the students how to use their eyes; for this instruction a small block of wood was taken in the hand of the lecturer, who placed it in various positions so as to best bring in view its outlines, color, and differences of surface, while he demonstrated that the uninstructed eye sees but little of what it might observe.

In his lectures on pathology, the precious specimens preserved in alcohol in sealed jars were brought out and passed through the hands of the class. These specimens have furnished the imperishable facts that are to be found in his Cellular Pathology, and the Pathology of Tumors. No wonder that he watched the transit along the class of these jars with anxiety like a mother's when watching her infant in danger, nor that a sharp word of reproof often followed awkward handling.

How accurate was his knowledge of the pieces he was to consider in his demonstrative course, was shown on one occasion when, for the purpose of microscopic work, I had removed the merest fragment from a cerebellum; he instantly detected it, halted in his lecture, and administered a reproof to the unknown marauder. Carelessness and inattention on the part of a student was at once observed and often chided. One whose eyes wandered through the window to something outside, was notified that if he saw anything there more interesting than the lecture, he had better retire. A luckless American with Bödeker's Guide for Travelers, once wandered into his lecture-room, and soon giving book preference to lecturer, he received a sharp reproof.

Time is too short for Virchow; for completion of the work he always has on hand, the day should number more than twenty-four hours. Not infrequently he spoke three times in one day. Once I heard him lecture in the forenoon, and in the evening listened to a long political speech by him; in the afternoon of the same day he was engaged in sharp debate in the Reichstag, and all this while carrying on the writings before mentioned.

Political life has evident fascination for him, for, while these lines are being penned, the telegram comes that he is a candidate for reëlection to the House of Representatives. As a speaker Virchow is exceedingly calm and deliberate; and whether before a class of students or a political club, he is never carried away by the "torrent, tempest, and whirlpool of passion," but his uttered sentences, scarcely distinguishable from his written ones, are clear, logical, forcible, and convincing. In person Virchow is of average stature; his expression is that of extraordinary courage; and his attention once drawn to you, you feel as if he were fixing you, in focus, on the object-glass of his mental microscope.

A few years ago the French government, on the occasion of the death of Claude Bernard, deputed Gambetta to pronounce an *éloge* on the great scientist; this oration, replete with supreme eloquence, closed with the remarkable words: "We now offer our salutations to Claude Bernard on his entrance into immortality." The hand of Death had then closed the door against Envy. But a few months ago the world was witness of still greater salutations which greeted the ear of one yet living; men of all tongues, and of all climes where medicine is a cultivated science, sent gifts, offerings, and congratulations to Virchow on the anniversary of his seventieth birthday. So profusely were these honors heaped upon him, that had Horace put to him his question, *Natales grate numeras?* it could have received no negative answer. Among the offerings was a medallion of gold, the coinage of the gifts of many friendly hands. But as form chiseled from marble, and feature limned by the pencil, are perishable, these gifts of art were surpassed by another offering: this was a sheaf harvested from the best fields of German medicine, composed of fascicles written by hands trained by the great teacher; this offering, "the enduring produce of immortal mind," was the most noble and imperishable of all, since it was wrought by the merciful hand of Medicine, and, besides homage to the master, it contained a solace to pain and disease, the perpetual heritage of our race.

RUDOLPH VIRCHOW.

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Read before the San Francisco Medico-Chirurgical Society.

Dr. Lane has wisely chosen when he selected Rudolph Virchow as his theme on this inaugural night of our new society. Like the statue of liberty at the entrance to the harbor of New York, Virchow stands at our entrance to the realms of scientific research, holding aloft the torch of truth that has drawn so much of its illuminating power from his vigorous mind Of all living scientists none has done as much to lift medicine out of the mire of ignorance in which it lay during the early part of this century, none has so uniformly thrown light into each portion of the wide field of medicine that he had entered.

In order to properly appreciate what Virchow has done, we must call to mind the condition of medical science when he began his career. Then all was confusion and disorder. It is difficult for us to picture to ourselves the state of affairs at that time, but a glance at one of the medical volumes of the day will point out its chaotic condition. The conceptions of disease were most crude and irrational. The relations between physiology and pathology (of which so little was then known) and the healing art, had not yet become well established, and the treatment of the unfortunate patient was sad indeed. A mass of traditions had been handed down from the past ages and were accepted as doctrines of practice, each physician selecting his methods from among the many varied systems equally in vogue, or taking at random from here and from there without guiding principles. On the one hand we see the polypharmacy that had gradually accumulated during centuries from the piled-up, unsifted experiences of each generation of physicians, while on the other we meet with the therapeutic nihilism, that arose in Vienna from the scalpel of Rokitansky. It is clear to our minds how intelligent practitioners, tiring of the blind groping in the dark that must necessarily result from the instructions of those who had gone before them, would have hailed with enthusiasm the clearly defined teachings concerning disease that emanated from the pathological laboratory of Vienna, accepting, even if sorrowfully, the humiliating doctrine that we are helpless against disease, that all that we can do is to protect the patient from harm and let nature do the rest.

In was against this nihilistic helplessness that the new school of medicine, of which Virchow was one of the most prominent members, arose, and turned the current of medical thought to the scientific investigation of disease, to the study of its relations to physiology, teaching that the same processes that occurred in health were likewise operating in the morbid state, that disease was not some foreign element introduced into the economy, but rather the operation of physiological laws under altered conditions.

What medical practice was when Virchow began his labors is well shown by a forcible article by Wunderlich, in the *Archiv für Physiologische Heilkunde*, in which he says: "If we inquire what decides the selection of a certain remedy in a given case, we will find it to be simply arbitrary choice. In any consultation, from which the credulous patient expects so much, we can learn how the various remedies are presented for consideration. One 'believes' quinine might be given, a second 'thinks' wine might be better, while to the third it 'seems' that iron is indicated. No one for a moment considers it necessary to give a reason for his opinion, and many a one would be embarrassed if he were called upon for a justification for the administration of antimony or mercury, lead or zinc, belladonna or hyoscyamus. Hence it has been found convenient in medicine to appeal to tact. Through fear that lack of thought and lack of reason might be detected, a screen is made of the inscrutible power of divination."

Virchow, at that time a young prosector in Berlin, rose against this blind empiricism, as well as against the paralyzing nihilism that began to replace it, and from the editorial desk of the *Archiv für Pathiologische Anatomie and Physiologie and für klinische Medizin* hurled his thunderbolts at the enemies of scientific medicine. He stated that medical practice and science are inseparably bound to one another, that medical skill must turn aside from crude empiricism and strive to attain clear scientific rationalism, teaching that the ultimate problem of medical science is its application to practice. He first applied physiological methods to the study of abnormal conditions, giving birth to the new science of experimental pathology.

What he has done for pathology we have just heard, but probably greater than any direct contributions that Virchow may have made to medicine, greater than the vast stock of facts that arose in that fertile brain, has been the result of his vivifying influence upon those who have sat at his feet. The seeds of science that he has so lavishly scattered have thrived most luxuriantly, and the aged but still bright and active investigator can view with pleasure the wonderful results that have been accomplished by the vast legion of his pupils, who have pursued his methods and have multiplied a thousand-fold the work of his hands.

433 Geary street.

RUDOLPH VIRCHOW.

By David Cohn, M. D., San Francisco, Cal.

Read before the San Francisco Medico-Chirurgical Society.

At the time of the celebration of Virchow's seventieth birthday, in October, 1891, one writer said that to draw an exhaustive picture of the life and works of Virchow would require a mind as broad as that of the great man himself; that he has left so many deep traces in so numerous fields of human knowledge and research, that the representatives of apparently different branches have claimed him as their own. I shall confine myself this evening to a few remarks regarding what Virchow has accomplished for clinical medicine, for the practitioner of medicine, and to a few reminiscences.

When the student of to-day enters upon the study of medicine, he is taught, as a matter of fact, that our science is based on the study of natural sciences. But how was it half a century ago? When Virchow, the young prosector of the Charité Hospital, of Berlin, appeared in the arena, the science of medicine was a sad "conglomerate of mysticism, blind belief in the authorities of the past, of rationalism and the grossest empirism." It is true, that just then Rokitansky had presented to the medical world his great work on pathological anatomy, and it appeared as if the new Vienna school of medicine had laid a foundation for the theory of disease that could not be shaken; it appeared as if the system of pathological anatomy of the new reformer of our science had subjugated chemistry, physiology and clinical study. It was against this doctrine that Virchow first remonstrated. He emphasized and demonstrated that the pathological anatomist, to revolutionize science, must also be a physiological pathologist; that pathological physiology could never be construed out of pathological anatomy; that that science must not be a matter of speculation, of hypothesis, but a sovereign science of facts and experiments.

It was the experimental method of research which Magendie had opened and which Virchow called into requisition for the study of disease. He openly condemned Rokitansky's theory of crases and dyscrasies and, to supplement the results of the dissecting knife, he urged clinical observation, experiment, and the study of physiological action. These very auxiliaries, and above all the microscope—and that is the great deed of Virchow and his pupils—have caused the great revolution in the science of medicine and in the theory of disease itself. He has associated pathological anatomy with pathological physiology and made both the foundation of modern clinical medicine. The practitioner of medicine can say with pride, Virchow has had the gratification that the clinical medicine of our days is constantly showing its gratitude towards its benefactor, for his teachings, by working with him in his path and enriching experimental physiology by new discoveries made in the clinical laboratories of our hospitals.

You all know, and have heard to-night, what the epochal work of Virchow's life, his "Cellular Pathology," has done for the science of medicine. Huxley, England's great biologist, in his address on The Connection of Biological Science with Medicine, delivered at the meeting of the International Congress of 1881, said: "I need not remind you of what Virchow's doctrine (his Cellular Pathology) has accomplished for the field of research; what a great power of research it has proved in the hand of the man to whose genius we owe its development."

I shall not recall to your minds, how many technical terms in medicine, which are to-day as familiar to us and the student of medicine as the A, B, C, to the school child, originated with him. It would be an ungrateful task to attempt to add a syllable to the eulogies delivered upon him by men of different countries and different schools, in different languages. But I shall ask your kind permission to quote here from an address delivered in London, a few months ago.

It is well known that Virchow, who already many years ago had been honored by the oldest scientific association of London, the Royal Society, by being elected honorary member, and upon a later occasion had been presented with the Copley gold medal, had this year received an invitation to deliver the Croonian lecture. His reception by the various scientific bodies of the great metropolis has been unprecedented in the annals of our science. The eulogies delivered upon him by men like Huxley, James Paget, Andrew Clark, Joseph Lister and others, and the enthusiasm displayed wherever he appeared, make his sojourn in London seem like the triumphal march of a hero in science. It must have touched his heart and made him feel proud when one speaker called him the German Harvey.

Tuesday, March 21st, a special meeting of the faculty of Cambridge took place, for the purpose of presenting to Virchow the honorary diploma of Doctor of Science. Dr. Sandys, as speaker, delivered the following address, in beautiful Latin, which I have taken the liberty to translate:

"The distinguished rector of the University of Berlin, a man who has earned great laurels, not only in the science of medicine and public health, but also in anthropology, ethnology and archeology; a man upon whom the highest honors have been showered on his 60th and 70th anniversaries, presents us ample argument for an address. Greater, as he is, than our words can present him, he involuntarily has to listen to our words of laudation. But, louder than our words, his own works, his own eloquent writings, his illustrious disciples bring forth his praise. Perhaps you have read the oration, in which, upon assuming the rectorate, in the presence of the whole University, he, the leader and standard-bearer of the liberal party, declared that the true academical liberty is based upon the liberty of teaching and the liberty of learning. You have certainly read, and perhaps heard, that lecture, in which he only recently assigned to pathology the true place among the biological sciences, and how he, in overlooking the courses and sources of his own studies, not only honored the immortal memory of our Harvey, but also freshened the almost forgotten glory of our Glisson. It is an undeniable fact that in Harvey's doctrine: *omne vivum ex ovo*, a large space had been left open. Let us rejoice that that space has, to a great extent, been filled by him, who first of all pronounced the sentence: "*omnis cellula e cellula.*" Therefore, it is just and right, that we decorate this great investigator of nature with our honorary title. For wherever the study of medicine is so happily combined with the study of nature, the results must be great. It is through the labors of such men that the words become facts, which should be inscribed over the portals of the temple of Health : Without the knowledge of nature, there is no science of medicine. I present to you, members of the Royal Society, our member of German birth, Rudolph Virchow."

It would fill volumes were we to enumerate the eulogies and panegyrics which were written for Virchow, or pronounced in his presence. It must have been touching in the extreme to see the coryphees of our profession, men older than he himself, hasten from the remotest parts of the civilized world, from all scientific centres, to bring him their tribute of love, admiration, and gratitude. No man of modern times has reached that degree of popularity among the men of science. To describe what he has done not only for our science, but for the welfare of mankind—for he is the acknowledged originator of our modern system of hygiene—would require more than the pen of one man. It would demand a combination of savants similar to that recently formed to depict the life and works of Alexander von Humboldt.

I may here be permitted to remark that in many respects a similarity of character, in their political as well as in their scientific life, can be found in Humboldt and Virchow. With the same eagle eye with which Virchow watches the development of every branch of natural and medical science, Alex. v. Humboldt followed the progress and achievements of human knowledge up to the hour of his death. I am not using these words figuratively. In the summer of 1859 I was attending the lectures of Du Bois-Raymond on physiology. One day the students were notified that the professor had succeeded in bringing some living specimens of electric fish from the Mediterranean sea to Berlin, and would present them to the students. The auditorium was overcrowded, and the students eager to get a shock, when unexpectedly the door opened and Humboldt, then 90 years old, leaning upon the arm of Prince Albert, husband of Queen Victoria, who happened to be in Berlin at the time, entered. He took a seat among the students, listened to the lecture, and like every student put his hand into the water to receive a shock. A few weeks later—on the 6th day of May, 1859—we followed him to his grave; and the man who, at the Berlin Academy of Sciences, delivered the most eloquent eulogy on the centenary of Humboldt's birth, on September 14, 1869, was Rudolph Virchow.

To see Virchow in his advanced years at work in his laboratory; to see him conduct the Anthropological Society; to see him preside at the great Medical Society of Berlin, is a revelation. I had the good fortune to be present at the great debate on Koch's lymph, which took place in the months of January and February, 1891, during six consecutive sessions of this society, which includes the most prominent practitioners and the great medical lights of the German metropolis. Having studied under Virchow, in 1858 and 1859, I gazed upon him again after a lapse of more than 30 years. A large number of foreign physicians attended as guests, as it was known that the heads of the most celebrated clinics were to report the results of their clinical observations. When Virchow supplemented their reports by producing and demonstrating the specimens from his autopsies, and raised his voice of warning, it sounded like thunder from the Olympus of science. The greatest commotion was created when he related that in a case of tubercular meningitis in a child of two years, which had been injected two days before death in Henoch's pediatric clinic, he found such an extensive hyperemia in the meninges and the whole brain as he had never seen in any brain before. It is too well known to all of you that Virchow was the first to demonstrate the fallacy of the premature conclusions at which Koch had arrived. Nothing in our science escapes his mind. To him we can apply the words which Boeckh, the great philologist, wrote under his portrait: "I am growing old, but I am always learning."

Let us hope that he may long enjoy that vigor of youth which we admire in him to-day, that he may work longer and longer and invite our renewed gratitude; and gratitude—as a Scotch philosopher has said, whom old Bunsen quoted, when he addressed Virchow in the name of the University of Heidelberg—means to a great extent a wish for more and more.

Goethe has said that "in the honor paid to a great man by other nations, his own nation participates and glories." I feel the full force of this beautiful sentiment when I see you assembled here to-night at our first meeting to listen to our distinguished speaker's address on "Virchow." May this beginning prove auspicious for our new Society; may we work together in the spirit of the man to whom we have paid homage to-night, and may his very name prove to our Society: *nomen et omen.*

1404 Sutter street.

THE THERAPEUTICS OF DIPHTHERIA.

By T. A. ROTTANZI, M. D., San Francisco, Cal.

Read before the California Academy of Medicine.

In selecting this as a theme for discussion, my object was, that should new ideas be entertained by any members of this Society, they should be brought forward. In the second place, the great mortality occurring in diphtheria should stimulate us, especially the younger members, in the search of remedies that may be the means of saving many valuable lives.

In looking over the reports of the health department of our city for the past five years, I found that of a total of 31,704 deaths from all causes, 904 were from this dreadful disease. The mortality, as compared to the number of cases reported, is still more appalling, being in 1888 27 per cent., and in 1889 33.4 per cent.

Before entering upon the subject of this paper, a brief outline of the morbid conditions to be encountered, and the objects to be attained, will not be out of place. According to the theory of Bretonneau and Trousseau, diphtheria is first a local trouble, which afterwards becomes systemic through the absorption of toxic products. Klebs and Loeffler proved that the disease was bacillary in character, the bacilli being located on the surface of the false membrane that is generally found during the commencement of the disease on the tonsils and pillars of the fauces, these bacilli being separated from the affected mucous tissues by a thin adherent fibrinous mass. Roux and Yersin confirmed the discovery of Klebs and Loeffler regarding the specific action of the microbe, and added to our knowledge by proving in their experiments that healthy mucous membranes were unaffected by contact of the bacillus. Chantemasse and Widal, upon Gaucher advocating the antiseptic treatment, experimented and found that carbolic acid was the most efficient germicide.

The disease itself, in the great majority of cases, produces its fatal termination by the extension of the pseudo-membranes that are formed in its course, so that in the treatment of this affection the principal objects to be attained are: (1) Preventing the extension of the local manifestation of the disease. (2) Destruction of the specific germ. (3)

Preventing, if possible, the absorption of the toxic products and hastening their elimination.

Reviewing the methods pursued, we find that almost every remedy in the category of medicine has been used in the treatment of this affection. The various caustics have been applied and then discarded, only to be again resurrected and lauded. Exclusive treatment by antiseptics has been praised by some and found wanting by others. In order to accomplish the foregoing indications a modification of the many methods is required. It is very true that in destroying the nidus of the affection, *i. e.*, the false membrane, we do away with one of the greatest impediments to successfully combatting the malady; but in the application of caustic remedies to accomplish this do we not create new lesions in the unaffected tissues, and thereby produce for the germs new soil in which they may continue their ravages? Do we not thus make channels through which their toxic products may enter the system? In allowing these false tissues to remain, and directing our attention to the destruction of the germ itself, by the thorough application of antiseptics, we leave the toxic products behind, and with the consequent degeneration of the pseudo-membranes and the exposing of the abraded surface beneath, new and greater dangers beset us, viz., the possible absorption of the toxalbumins present. What is desired is a remedy or combination of remedies by which we can avoid these dangers; but before advocating any special measure I will mention a few methods that have of late been extensively used.

Gaucher applies camphor and carbolic acid topically by means of a brush. Hutinel adopts Gaucher's method, substituting at times bichloride of mercury or salicylic acid. He prefers to apply the remedy in a spray. Dernot gives chinolin, both as a gargle and topical remedy. Simon prefers salicylic acid, and, when the membranes are very adherent, adds tincture of iron in the local application. Huchard uses in the room sprays of carbolic acid, and internally and locally gives salicylic acid. Goldwug employed the tincture of iodine. Florain and Wichelmy recommend chloride of zinc, to be applied locally. Jaenicke advocated methyl violet as a topical remedy. Taube and Fischer used pyoktanin with great success. Focheimer uses ice internally and externally, papayotin locally, corrosive sublimate internally. Rosenthal says tincture of the chloride of iron is infallible as a local application. Peroxide of hydrogen has been used with varying success by many.

The remedy that I desire to advocate, and to which I attribute my success, is tannin. Being rather conservative, I feel that no positive conclusion can be drawn from the limited number of cases treated. Suffice it to say, that during the last four months I have had seven cases without a death. Two others, suspected cases, residing in the immediate vicinity of those that I was attending, and which I did not report to the health authorities owing to the rapid subsidence of all symptoms, are not taken into consideration. Lescure, in the *Bulletin Médical*, reports 54 cases, without a death. He claims his success to be due to the chromic acid employed; but his using as a collutorium tannic acid in a 20-per cent. solution rather makes me attribute the success to this remedy.

Looking at the physiological action of this drug in its local application, we find it is a powerful astringent, producing contraction of all the elements that form the mucous membrane. It forms with albumin a dense coagulum. It destroys the bacillus of Loeffler. I believe that upon a denuded surface this coagulum would act as a leathery protection against the encroachment of the bacillus and the passage of its toxic products. In the adjoining tissues, which may be swollen through sympathy or metastasis, its therapeutic action would prevent any extension of the trouble; and it is to these tissues that we should direct our attention, in order that no extension of the false membranes may occur.

To the topical application should be added that antiseptic which has been proven to be the most efficacious, viz., carbolic acid. Corrosive sublimate seems to have the most adherents as an internal remedy for the elimination of and for the combatting of the poisonous products absorbed. I have used it constantly, and never found it wanting. For the continued hyperpyrexia quinine is indicated. Sponge bathing may be substituted with great benefit in infants where the administration of the drug is impossible. Where great anemia occurs, tincture of the chloride of iron is an invaluable aid. I generally combine this remedy with the bichloride of mercury, owing to the fact that through the administration of the sublimate anemia may be produced. The diet should consist of wholesome, easily digested foods, such as milk, good soups, eggs, broths, etc. When great prostration occurs, alcohol should be employed.

I may add that since writing this article, I have been fortunate enough to have the method tried in six cases, and all with the same result.

301 Third street.

THE CAUSATION AND TREATMENT OF RHEUMATISM.

By C. E. Fowler, M.D., Sacramento, Cal.

Read before the Sacramento Society for Medical Improvement.

It has, in the present day, become a truism almost amounting to an axiom that unless there be a clear conception of the inherent primary cause of a disease, based upon scientific principles, the results of treatment of that disease will be largely a matter of conjecture. The time has long since arrived when "humors in the blood" will be accepted as a rational explanation of the etiology of morbid conditions. The mere advancement of a theory which may be lacking in many of the essentials necessary to a clear perception, will not suffice. To be accepted it must be in accordance with laws relating to the acknowledged fact that from certain causes certain effects must result. It must be rational and appeal to the common sense of the individual.

Several theories have been advanced as to the etiology of rheumatism. Each are more or less tenable, and all are susceptible of considerable adverse criticism. It is my purpose to present to the Society a theory (not original) as to the cause of this disease that appears to be entirely rational and worthy of our consideration.

Rheumatism appears in a great variety of conditions, from the "twinges" or "aches in the bones," whereby the subject can foretell climatic changes, to the poor mortal, bent and deformed, a misery to himself and an object of pity to his fellows. It is a common affection, often of considerable duration, and calls for all the skill which the physician may possess, as it has not a tendency to be removed by the unaided powers of nature.

The following classification of the more important conditions of this disease is generally accepted: (1) Rheumatic fever, defined as an acute, non-contagious, febrile affection, depending probably upon some unknown infective agent, and characterized by multiple arthritis, and a special tendency to involve the heart. (2) Subacute rheumatism, considered as representing a milder form of the disease, in which all the symptoms are less pronounced. (3) Chronic rheumatism, a still slower process, which may succeed upon the acute type, but more frequently comes on insidiously in persons who have passed the middle period of life. The following conditions are mentioned, because they are often falsely designated as and confounded with true rheumatism: The so-called muscular rheumatism, a painful affection involving the muscles, intramuscular planes, and the periosteum contiguous to their points of attachment. (4) Rheumatoid arthritis, a chronic disease of the joints, characterized by changes in the cartilages and synovial membranes, with peculiar new formations of bone, calcareous infiltrations, and often great deformity.

As predisposing factors in the etiology of this disease, we usually find the following mentioned. Age, sex, climate, occupation, and heredity, the concluding statement generally being that the "essential cause of rheumatism is still unknown." The medical attendant is often nonplused when asked by a patient as to the reason why he should have attacks of rheumatism, and is often compelled to answer, laconically, "Lactic acid in the blood;" and if pressed further, is apt to find himself not possessed of a very large reserve fund of information.

At present three theories are advanced: The Metabolic Theory—that there is a morbific principle produced by a defective process of assimilation. This principle is supposed by some to be lactic acid, or certain combinations of lactic acid. Richardson claims that he has produced rheumatism by administering lactic acid internally, and also hypodermically. The Nervous Theory—which was advanced by J. K. Mitchell, and has many advocates. According to this view either the nerve centres are primarily affected by cold, and the local lesions resulting therefrom are essentially trophic in character, or else the primary nervous disturbance leads to retrograde metabolism, and thus to the accumulation of the false product (lactic acid) in the system. The Germ Theory—which is that the arthritic phenomena are due to a specific microbe. In favor of this view may be mentioned the close analogy that exists between rheumatism and certain of the infectious diseases. The analogy is marked between gonorrhea, scarlet fever, and various septic processes, all of which are frequently associated with arthritis and endocarditis. The investigations hitherto made have not, however, shown the existence of any such microbe. Mantle and others have described certain micrococci in the blood of rheumatics; and organisms have been found in the secondary inflammations of the disease, but none can be said to be specific or peculiar.

In an admirable article upon this subject by William Henry Porter, of New York the following explanation as to the etiology of rheumatism is advanced, and I will endeavor to give a brief synopsis of the various reasons for his theory: It must first be admitted that certain definite chemical and physiological laws or principles govern the action of the animal organism, and constitute the phenomena commonly called life. Second: That deviation from these standards beyond a certain degree produces abnormal conditions, called diseases. That when certain kinds and quantities of food-stuffs, water, and mineral salts are introduced into the alimentary canal of a normally conditioned organism, with a certain amount of oxygen into the respiratory apparatus, certain definite results will always follow. These results being growth, development, and the sustaining of animal life; also in every 24 hours a definite kind and quantity of excrementious products will be eliminated from the body, especially by the urine. This may be termed a normal state of life.

It is also assumed that there is a fairly wide margin as to the amount of food-stuffs that can be ingested, digested, absorbed, transmitted by the liver and utilized in the system without deviation from the normal standard, and without abnormal changes in the excrementory results. While the individual remains within these limits the quality of the excrementitious products eliminated by the kidneys and lungs will continue to be of a given specific character—as, urea, uric acid, kreatinin, carbon dioxide, and water, and that while the amount of these principles may fluctuate, the body will still maintain a healthy normal standard. The body may also be subjected to cold and wet, change of climate and occupation, increased work or excitement within certain limits, and the physiological process will still be normal in character. On the other hand, if there be digression beyond these margins of safety, the foundation is laid for the introduction into the system of disease, and such digression becomes at once the prime factor in producing diseased conditions without external assistance.

With this idea firmly fixed in the mind, the development of rheumatism becomes at once simple and logical of explanation, and it can be classed as a strictly "dietetic disease." It follows that eating too much, or more than can be digested and assimilated, must be succeeded by deviation from the usual standard, and sooner or later by actual diseased conditions. Partaking too largely of those substances that are most easily oxidized, such as starch, sugar, and fats, will quickly result in exceeding the oxygenating capacity of the system, hence the more difficult task of oxidizing the constructive elements, or the proteid group, is incompletely accomplished, and bi-products at once appear in the urine. Thus it is seen that it is in the suboxidation of the proteid or albuminoid substances, diseases of this character originate.

Clinical observation shows it is those persons who partake too largely of sweets and vegetables that are most often affected by rheumatism, although there may be exceptions when the diet is too largely animal in composition. This is due to the fact that in an animal diet that more nearly answers the needs of the system there is less liability to over-eating than in a diet which does not. The oxygenating capacity of the system becoming exhausted, the percentage of urea in the urine falls, uric acid increases, and lactic acid appears in large quantities. The explanation of the formation of lactic acid is somewhat complex. It is known, that it does not appear in the blood, as such, any more than does uric acid, and that its development takes place in the renal epithelial cells out of the proteid molecule, which has lost its sulphur atom in the formation of sulphuric acid in the stomach. The molecule, having lost its atom of sulphur, is drawn into the mass of renal cells and normally breaks up into urea, uric acid, kreatinin, carbon dioxide, and water. The carbon dioxide drops back into the blood, and the other elements pass off in the urine. The lactic acid, in the renal tubules, acts upon the saline compounds, and forms lactates and disodic compounds; hence it is that lactic acid appears in the urine, only when produced in enormous quantities. So long as the above train of phenomena follow, no active symptoms of the disease occur, owing to the complete elimination of the abnormal products from the system through the kidneys. Should the suboxidation continue, however, digestion will become impaired, the general nutrition of the body is lessened, the liver, with the other glandular organs, becomes affected, the biliary secretion is retarded, and constipation and other symptoms in the case become prominent.

In this generally deteriorated condition of the system, should the body become exposed to cold and wet, nervous excesses of various kinds, muscular strains, etc., the general circulation is disturbed, internal congestions occur, and the disease develops into what is commonly termed rheumatism. These local congestions may induce only a sluggish circulation, and simple pressure pain due to the abnormal compression of the nerve ends; or the compression may reach an intensity of a true inflammation, with all the inflammatory exudations and other structural changes consequent upon inflammatory conditions. They may be transitory in character and dispersable, or become permanent to the extent of forming new tissue. Frequently, as a result of these local inflammatory conditions, the nutrition and functional activity of the protoplasmic elements of these regions may become abnormal in character, and out of the proteid molecule at such a point lactic acid is developed.

As nature objects to a free acid in the presence of the free alkalies, in the tissues, the lactic acid at once joins with the calcium and sodium salts, forming almost inseparable compounds, which become deposited in the substance of the structures involved. The appearance of the urine, which hitherto may have been abnormal in character, may now be much improved, during the time these compounds are being deposited in the tissues, but all the local symptoms are greatly intensified. The congested regions become more inflamed, in nature's attempt to remove or incapsulate these foreign substances; pain is increased, and gives rise to the extensive lesions common to rheumatism. Associated with these local changes about the joints and in the muscles, similar processes are frequently developed in the pericardium and endocardium, resulting finally in mechanical defects in the heart's action. Occasionally the meninges are involved, and, in fact, any or all the structures of the body may participate in these inflammatory changes.

It is thus seen that by the sub-oxidation theory all the pathological changes and symptoms, pertaining to the various forms of rheumatism, are explained. It also throws much light on the reason why the administration of all drugs has failed in this disease, and until we obtain definite knowledge of the processes by which the lesions and symptoms are produced, we cannot hope to treat rheumatism upon rational and scientific principles.

Acting upon this theory, the treatment of the disease resolves itself into several channels of procedure. First, it is requisite there should be a thorough knowledge of the composition and utility of the various food-stuffs, in order to select those most effectually conserving the oxygenating capacity of the system, and at the same time yielding the largest amount of constructive material to the damaged organism with the least loss of vital energy. Also, to choose those that can be the most readily digested, and at the same time produce the minimum of by-products. Second: The selection of medicinal agents that have some influence in modifying or removing the painful symptoms. Third: External applications, including electricity. The scope of this paper will not admit of the discussion of the treatment of rheumatism from a dietetic standpoint; suffice it to say that it is well worthy of careful consideration, and, in view of later scientific research, will probably be, in the main, a factor in the treatment, not only of this disease, but of many others.

In the selection of medicinal agents, nearly every drug of the pharmacopeia has been tried, but probably the alkaline treatment best holds its own, and in weak and anemic patients is preferable. During the last ten years, the effect of salicylic acid has been much studied, and it is undoubtedly a valuable drug. Da Costa advises giving it in 10-grain doses every hour for 6 hours, then every 3 hours until 2 drachms have been taken. The contra-indications to the drug are nausea, ringing in the ears, and depression; and the drug should be discontinued if its administration causes these effects to any great degree. If salicylate of soda is given, much larger doses are required. Manufacturers of this drug say that the coal-tar product is much inferior to that made from wintergreen, and attribute failure in its action in many cases to this fact. As most of the salicylic acid dispensed from the drug stores is made from coal-tar, it would be well for practitioners to specify the special kind that is required.

For external treatment, wrapping the inflamed joints in cotton is advised, with daily applications of some stimulating liniment. I have found equal parts of chloroform, ether, tincture of opium, spirits of camphor and tincture of capsicum, an excellent embrocation for the purpose. For the treatment of the sub-acute and muscular forms of rheumatism, the daily application of the galvanic current can be highly recommended.

A few words as to the effect of galvanism upon morbid conditions existing in the human system will explain the happy results often obtained in the use of this agent in rheumatism. It acts as a direct stimulant, and increases the supply of blood to the parts. It increases the heat, as well as the volume of the parts subjected to its influence, by augmenting the contractile energy of the vascular system. It counteracts the secondary changes which obtain in inactive nerves and muscles and tends to restoring their lost functions. It also tends to soothe and tranquilize the most nervous organism, and to remove morbid conditions of the tissues arising from defective circulation. Through its electrolytic or decomposing potency we may be able to discuss pathological concretions which accumulate in diseased regions, and, by disturbing the particles of matter that enter into the formation of nerves and muscles, excite them to healthful activity. Too much care and patience, however, cannot be exercised in the use of this agent. Many a nervous patient has been frightened, from the use of electricity by heroic treatment, that might have been relieved, and years of suffering dispelled, but for the imprudence of the operator in using a current of high tension. The mere application of a couple of electrodes to a diseased joint, without observing the *technique* necessary to a proper application of the galvanic or faradic current, is very apt to prove disappointing to patient and operator. The electrodes should be large, and under no circumstances applied when cold. The patient should be so placed that chilling of the parts is impossible, as otherwise what would be a successful *sèance* will result only in harm. Every effort should be made to increase the conductivity of the skin, since it offers the greatest resistance to the passage of the current. This is best done by wringing the electrodes out in a hot solution of bicarbonate of sodium and then applying at once. By this plan much stronger currents can be used without damage to the skin, which is always to be avoided.

As to the dosage of electricity, any joint where you can apply the hand-sponge—such as the knee, shoulder, or wrist—may receive from 15 to 20 milliamperes, but not much more without having difficulty with the skin. It is undoubtedly true that we could get better results from the use of stronger currents, but, with our present imperfect system of electrodes, it is questionable whether it would be advisable to use them. In a few cases that have come under my care, of the milder forms of sub-acute and muscular rheumatism, where the very large electrodes of the cabinet were used, combined with heat, a single application of the galvanic current was sufficient to cause complete relief without return of the painful symptoms. This happy result will not often be obtained in the average run of cases that appear, but, as an adjunct to other treatment, galvanism cannot be too highly extolled.

W. A. Robertson, of Albany, in the *Journal of Electro-Therapeutics*, says he has obtained better results from the interrupted galvanic current than from the constant current, in patients of a phlegmatic temperament; thus claiming that all patients affected with this disease cannot be treated alike. In conclusion, I would say that the subject of rheumatism presents a splendid field for investigation, and discovery. Its electrical treatment is only now in its infancy, but the good results already obtained show what we may hope for in the future, when a wider experience and a more extended study have increased our knowledge.

4th and K Streets.

DEPARTMENTS.

OBSTETRICS, GYNECOLOGY AND PEDIATRICS.

By WALLACE A. BRIGGS, M. D., Sacramento, Cal., and
HENRY GIBBONS, JR., M. D., Professor of Obstetrics and Diseases of Women, Cooper Medical College, San Francisco, Cal.

Remarks on Uterine Fibroids.—Since 1880 DR. TERRILLON has watched the progress of 235 cases of uterine fibroids, 122 of which were treated surgically, and the reminder by ordinary methods. In 45 of 80 cases of abdominal hysterectomy, the pedicle was left within the abdomen, and the ligature used, except in a very few instances, was a rubber band. In the remaining 35 the pedicle was fixed outside the abdomen and covered with tannin, mixed with iodoform powder. Battey's operation was performed 30 times without a death, and with most favorable results in 23 cases, the remainder deriving only temporary benefit. This operation is often difficult because the ovaries may be below the tumor, inaccessible in the bottom of the pelvis. The most striking condition in these cases is the frequency of lesions of the tubes and ovaries. True hypertrophic salpingitis, with polycystic ovaries or sclerosis, was found in 20 cases, and muco-purulent salpingitis in three. In three other cases the tumor, already large, continued to increase, and it became necessary to remove it by the abdominal method a few years after the first operation. Of 12 cases of ablation of uterus and fibroid by the vaginal method, 10 were successful. This operation is usually possible, and may be said to be without danger when the tumor is movable and of moderate size, but in the opinion of the author is not always advisable, as these tumors sometimes remain small and cause little discomfort. When the rectum or bladder is involved, or when there is any reason to fear cancer, an operation cannot be performed too soon. Of the 113 non-surgical cases 17 died of complications due to the tumor, and the remainder were treated by various methods. Rest was found efficacious in the relief of pain and the prevention of hemorrhage, and a bandage lessened discomfort when the fibroid was movable. Dr. Terrillon attaches little importance to the use of iodide of potash or ergot in any form, and places most reliance on electricity and salt baths. Electricity nearly always benefits, if carefully and perseveringly applied, but it is very doubtful whether it reduces the volume of the tumor. It is now little used for this end alone. Salt baths often produce a wonderful effect upon patients enfeebled by abundant and repeated hemorrhage, but they must be used for several successive seasons to effect permanent benefit. There is no evidence for the general belief that they lessen the volume of fibroids. The menopause itself has no influence upon their size, and they often continue to grow after patients are 60 years old.—*Bulletin Générale de Thérapeutique*, June 15, 1893.

Treatment of Inflammation of the Annexes.—This important subject was fully discussed at the Fifth Gynecological Congress, at Breslau, on May 27th, 1893. The debate turned upon two points: The operation to be preferred in suppurative salpingitis, and the importance of examining the pus obtained by the operation, with a view to determining the subsequent method of procedure. It would seem that the method of extirpating the uterus *per vaginam*, in order to reach the diseased tubes, is not in great favor on the other side of the Vosges. M. SCHAUTA has had no personal experience, and M. M. MARTIN, CHOBRAK, WINCKEL, and ABEL did not even mention it. It was, however, defended by

M. Leopold, who has performed this operation twenty-four times, and who believes that when the lesions are bi-lateral, the useless uterus should be removed. M. Landau, of Berlin, although he uses both methods, believes the Péan-Segoud operation destined to a great future. Opinions were divided as to the necessity of the pus examination. M. Menge, of Leipzig, thinks that it should always be made, and that it is dangerous to leave the abdomen without drainage, unless the pus is found to be absolutely sterile. Schauta agreed with him, but Martin, of Berlin, and Kaltenbach, of Halle, have given up drainage, and if a purulent sac should be broken during the operation, would carefully wash out the cavity with boracic acid before closing the abdomen. Chobrak only drains in exceptional cases, as, for instance, when the abscess is connected with the rectum, and if pus should escape into the peritoneum, would sponge with sterilized gauze and close the wound without the least anxiety. The question of resection of the tubes and ovaries was incidentally treated. Martin is a partisan of this operation, though he would extirpate if there were the slightest suspicion of infection. Sometimes it is only necessary to wash and scrape the tubes. He would remove the diseased portion of the ovary, carefully suturing the remaining parts. Massage of the annexes was recomended except in inflammatory lesions.—*Union Médicale*, June 6, 1893.

Treatment of Infantile Convulsions.—M. Jules Simon advises the following method: (1) Relieve the digestive organs by a laxative, or by tickling the throat until vomiting occurs. (2) If the attack continues, give ether or chloroform by inhalation. (3) Administer within 24 hours the following anti-spasmodic mixture:

Chloral Hydrate	āā gm 1
Bromide of Potash	
Syrup of Codeine	gtts 10
Tincture of musk	
Tincture of Aconite root	āā gtts 10
Orange flower water	gm 100

(4) If the attack is grave and prolonged, place the patient in a warm bath, and apply, with suitable antiseptic precautions, a small blister to the back of the neck, or to the epigastrium, leaving it in place not longer than three hours. As soon as vesication is established, substitute a poultice for the blister.—*Union Médicale*, June 1, 1893.

SURGERY.

By T. W. Huntington, B. A., M. D., Surgeon Southern Pacific Company's Hospital, Sacramento, Cal.,

J. F. Morse, M. D., Surgeon German Hospital, San Francisco, Cal., and

G. F. Shiels, M. D., C. M., F. R. C. S. E., Surgeon Polyclinic, San Francisco, Cal.

Prevention of Shortening and Other Forms of Non-union after Fracture.—In demonstrating a method of preventing shortening after fracture of the long bones, by the use of rigid metallic pins, inserted subcutaneously, Dr. C. B. Keetley says the instruments required are: (1) Two L shaped pins of hardened steel, thickly plated with silver. (2) A long bladed bradawl. (3) A pointed tenotomy knife. (4) A flat sand pillow. Each L pin consists of two arms, one cylindrical the other flattened, in a plane at right angles to the rounded arm. The cylindrical arm is of the diameter of a No. 7 French catheter, and has a rounded, blunt point. The length is nearly 3½ inches. The flattened arm of one pin is 3 inches long, that of the other being 5 inches. Both are ¼ inch wide, about $\frac{1}{10}$ inch thick, and there are notches at the edges at intervals of ¼ inch. The patella bradawl has a blade 3½ inches long, and both its blade and its handle are of one smooth piece of nickeled steel. In the operation stringent antiseptic precautions must be used. The fracture should be reduced under ether, breaking it down again if union has taken place recently in a bad position. Whilst two assistants make extension and counter-extension, the fractured ends should be adjusted and the precise seat of fracture ascertained. Select a point in each fragment likely to be clear of the fracture and in such a position that a straight line from it transversely perforating the bone would keep well clear of important vessels and nerves, synovial membrane, etc. The skin should be punctured and the bradawl pushed through the puncture down to the bone and used as a probe to determine its position, and then bore steadily through; care being taken not to break the long blade and not to perforate obliquely. A director is slipped along the awl, which is withdrawn by twisting and not jerking it out; one of the pins is passed through the bone and the director withdrawn. The same process is repeated in the case of the upper fragment. The two pins are turned into such a position that the flat arm of one lies upon and touches the flat arm of the other. The advantage of making the flat arms of different lengths is that they can be fixed at any distance from two to six inches apart. Full extension being made and the limb demonstrated by measurement to be of proper length, the flat arms of the pins are lashed together with silver wire, pulled taught and twisted home at the ends. Iodoform gauze wrung out in sublimate solution (1:2000) should be placed beneath and above the external arms of the pins. Over this a well rolled wool pad, and all round the limb, at and near the fracture, there should be a sheet of absorbent wool. The whole should be bandaged firmly and evenly. Lastly, external appliances, suitable to the case, should be put on. The pins can be left painlessly and apparently without doing harm in the femur, and, in combination with simple extension and the long splint, they can completely prevent shortening. The best time for inserting them is from 10 days to a fortnight after the accident. By then the effusions have become either absorbed or organized, leaving only well vitalized tissues to deal with any germ that might accidentally enter. By that time also it would be seen whether thorough reduction and ordinary appliances would suffice for the case or not, and at that period the tracts made for the pins need not communicate with the fracture itself.—*Lancet*, June 10, 1893.

OPHTHALMOLOGY, OTOLOGY AND LARYNGOLOGY.

By WM. ELLERY BRIGGS, M. D., Sacramento, Cal.

Acute Follicular Tonsilitis.—In a clinical lecture DR. GEO. M. LEFFERTS gives the following rules to assist in the differential diagnosis between acute follicular tonsilitis and diphtheria: (1) Remember that the membrane of diphtheria does not remain confined to the tonsils, but that it spreads to the uvula, soft palate, and perhaps to the post-pharyngeal wall; in other words, it may leave the tonsils. The pseudo-membrane of follicular tonsilitis never does this. (2) The membrane of diphtheria is closely adherent to the underlying parts, and you cannot lift it up from the mucous membrane without rupturing the capillary vessels, causing slight bleeding. The pseudo-membrane of follicular tonsilitis is easily raised, from the underlying mucous membrane, with a probe; it leaves no abraded surface beneath it, and very often you can draw out with the pseudo-membrane, the contents of the follicle, the mouth of which it covers. (3) The diphtheritic membrane is always thick. In follicular tonsilitis the membrane is thin and delicate. (4) The membrane in diphtheria is always of a dirty, yellowish color; the pseudo-membrane is pure white or of a pearl-gray; it is clean and bright. The membrane of diphtheria, after twenty-four or forty-eight hours, becomes necrotic, and takes on a dirty, blackish-gray color. (5) The tonsillar portion underlying the diphtheritic membrane is of a deep red or a bluish-red color; the underlying tissue, in a case of follicular tonsilitis, is bright red, never of a very dark, angry color.—*Medical and Surgical Reporter*, July 8, 1893.

Intralaryngeal Injections of Guaiacol and Menthol in Fetid Conditions of the Sputa.—DR. JAMES MCNAUGHTON reports two cases of fetid expectoration that were quickly cured after several other treatments had failed, by injections of 30 minims of the following solution into the larynx once daily for a few days: Guaiacol ʒiss, Menthol ʒx, Ol. Olivæ ℥viii—M. Three pills containing iodoform, creasote āā gr. i, croton choral hydrate gr. ii, were also given each day. The first case the author thought was one of abscess of the lung, so deep in its substance and covered with so much healthy lung that dulness was not discoverable. The other case was one of bronchitis in which phthisis was suspected. Both patients improved rapidly after a few intralaryngeal injections—the cough and expectoration ceased in an almost incredibly short time, and the general symptoms rapidly subsided.—*British Medical Journal.*

Cough of Nasal Origin.—DR. M. HERZOG reports the case of a girl 21 years old, who had suffered for two or three years from cough and a sensation of irritation as from a foreign body in the throat. All treatment had failed to relieve her. The nasal mucous membrane was pale and anemic, and in spots atrophic. In the left nasal cavity was a mucous band connecting the inferior turbinated body with the septum, stretching across and largely obliterating the inferior meatus. On the right side the inferior turbinated body showed some hypertrophy. There was also granular pharyngitis and hypertrophy of the pharyngeal and lingual tonsils. The condition of the pharynx was believed to be the cause of the cough, and was treated for some time without benefit. Later the band connecting the septum with the turbinated body was severed with a galvano-cautery knife with immediate and permanent relief from the almost constant and annoying cough.—*Medical News*, June 24, 1893.

Transillumination of the Mastoid Cells as a Means of Diagnosis of Mastoiditis Interna Suppurativa.—DR. GEO. W. CALDWELL describes an electric lamp devised for illuminating the mastoid cells for diagnosis of disease of that locality. A battery, a two or three candle power lamp (made by Meyrowitz, N. Y.), protected by a thin fenestrated rubber tubing which fits snugly into the auditory meatus by a washer of larger tubing. In a perfectly dark room the lamp is inserted well into the meatus, the fenestra directed backward, and the current connected. A healthy mastoid is immediately illuminated with a ruddy glow extending from the apex to the lateral sinuses and upward to the limits of the cells. When the auditory canal is small, obstructed, or painful, the illumination may be made by placing the lamp, properly protected, against the mastoid, and by looking into the auditory canal, the canal and tympanum will be seen to be filled with a rosy light from the posterior wall. By placing the lamp on different places on the mastoid the limitations of the cells and the position of the lateral sinus may be accurately mapped out, and the particular region in which a pathological process exists demonstrated. If the cells be occupied by a purulent collection the glow will be absent, the cells will be dark. Comparison with the opposite side renders the diagnosis complete. The author believes this method is scientifically accurate, easy of application, painless, strikingly pictorial, instantly decisive, and demonstrable to the patient's friends.—*Canada Lancet*, July, 1893.

DERMATOLOGY, SYPHILIS AND VENEREAL DISEASES.

By G. L. SIMMONS, JR., M. D., Sacramento, Cal.

Eczema Coccus of Unna.—At the April meeting of the Hamburg Medical Society, UNNA demonstrated eczema spots on the person of a servant in his laboratory in whom he had cultivated the coccus of eczema. The five spots were of the size of the German five-pfeunig piece, rounded, bright red efflorescences, mixed with dried vesicles. He has been able to produce the various stages. The cocci, while he demonstrated were taken from a section of the eczema vesicle on the arm of the servant. At the May meeting he showed a dog which he had inoculated in two places with the eczema coccus. On the dog the coccus produces a progressive loss of hair in the inoculated region, analogous to the alopecia pityrodes of the human race. Beyond this result the dog and the guinea pig when inoculated show no manifestations. The culture of the eczema coccus appears in opposition to the staphylococcus albus, as gray white, sharply-bounded flat bands and innumerable tiny isolated, glancing drops. They possess the form mostly of the diplococcus, and are distinguished from the staphylococcus chiefly by the enormous size of the individual cell. From the gonococcus they are differentiated by the iodide test.—*Monats. f. prakt. Dermat—Schmidt's Jahrbücher*, No. 4, 1893.

The Spread of Leprosy in Europe and Its Social Importance.—DR. ARNING contributes (*Wiener. klin. Wochenschr.*) a very interesting article under the above heading. He asserts that it is essentially a human disease, and that it spreads only through human agency. Further, that its progress in Europe is on the increase. The number of endemic cases in the western half of Europe amounts to 3,000, of which Norway contributes 1,200; Spain, 1,200; Portugal, 300; Sicily, 100; France and Northern Italy, 100; Malta, 70; Iceland, 100. Zambaco ("Les Lepreux de la Bretagne en 1892"), the indefatigable investigator, on this subject shows that leprosy has existed in Brittany from before the seventh century, and still exists in all its varied forms. It is generally sporadic, with no tendency to spread. Yet, on the other hand, Zambaco has seen cases of a very severe type presenting a perfect picture of leprosy. Again, there are cases of such slight manifestations that the differential diagnosis is quite difficult. Prof. Brousse, of Montpelier, has also proven the existence of endemic cases of leprosy. He mentions the poreso analgesia as a disease remnant of leprosy, which for centuries has existed in Brittany and Europe. The names of "Kahous," "Caquets," "Cagneux, "Caputs," "Cahets," "Cordiers," are synonomous with leprosy. These names occur in the folklore of Brittany. The "Moravian sickness" is nothing else than "lepra mutilans," which is met with in its fullest form. The majority of cases are of slow development. Syrngomylia is very difficult to differentiate from leprosy in some forms. To a question by Vidal as to whether Zambaco in his cases had observed the knotty swellings of the nerves, he answered that in the mutilating form of leprosy he had noticed it, but not in the anesthetic forms. Zambaco also is firm in the belief that leprosy spreads only through contagion.—*Schmidt's Jahrbücher*, April, 1893.

MATERIA MEDICA AND THERAPEUTICS.

By WM. WATT KERR, M. A., M. B., C. M., Professor of Clinical Medicine, University of California, San Francisco.

The Action of Some of the Recent Hypnotics on Pancreatic Digestion.—DR. JOHN GORDON, Aberdeen, has arrived at the following conclusions on this subject: (1) Chloralamid, antifebrin and antipyrin do not interfere, either in weak or strong solution, with the decomposition of starch into maltine and dextrin by pancreatic solution. (2) That sulphonal and urethan, when the solutions are weak, retard slightly the decomposition of starch into maltine and dextrine by pancreatic solution, and that the stronger solutions of these substances do not. (3) That paraldehyde in weak solutions has a distinctly retarding influence; and that when five minims were added to sixty c.c. of mucilage of starch, retardation was complete in presence of 0.75 c.c. of pancreatic solution.—*British Medical Journal*, April 22, 1893.

Calomel in Hepatic Ascites.—PALMA points out that, since Jendrassik called attention to the diuretic properties of calomel in hydropsic conditions, it has been employed in cardiac, nephritic and hepatic dropsies, giving, in the first condition, valuable results in the hands of most observers. Nephritic complications did not yield so satisfactorily, whereas opinions differed with regard to the benefits to be derived from calomel in hepatic affections. The author describes a series of eight cases of liver disease, comprising patients with and without ascites, in which this condition, when present, was secondary. These show a remarkably beneficial result in favor of the six ascitic cases, the urine being increased three to ten-fold in quantity, causing disappearance of the fluid in the abdominal cavity and all subjective symptoms. In the other two cases of ascites, treatment showed no results, the patients dying, while in hospital, from advanced disease and cholemia. Very slight diuresis only, though attended with improvement, was produced in two patients, whose disease was unaccompanied by any evidence of edema or ascites; but great relief was afforded with increase of urine, to a ninth and last patient, suffering from ascites due to secondary carcinomatous disease of the liver. The calomel was given during successive periods of three days, separated by intervals of one to three days, the drug being given either in repeated doses of 4½ to 9 grains daily, or in quantities decreasing from 15 to 6 grains daily. Two periods sufficed in the first cases quoted, and stomatitis and diarrhea were obviated by means of chlorate of potash gargles and opium, the latter only failing rarely and temporarily. Moreover, no renal or cardiac irritation was produced. The manner of action is not quite evident to the author, but he inclines to the view that calomel has a direct action upon the liver and kidneys, as the failure of the drug, in two of his cases, to produce diuresis, must be attributed to advanced disease of the liver, no kidney lesion being found *post-mortem*.—*British Medical Journal*, April 1, 1893.

The Intermittent Administration of Quinine in Malaria.—DR. F. H. WILLIAMS reports eighteen cases of malarial fever in which this method of administering quinine was followed by very beneficial results. The dose of the quinine was twenty grains in solution, administered when the temperature began to fall, and the same amount upon the seventh, fifteenth and twenty-second days.

This method lessens cinchonism, which is apt to follow continuous doses, as well as the amount of the remedy which is necessary, and looks to the prevention as well as to the cure. The remedy should not be given in pill form, but in solution; or, if it is important to consider the taste, in powder or in capsule. It is advantageous to give a cathartic with quinine, reducing the volume of the blood, and thus, in effect, the dose is made stronger. The anemia must not be overlooked; hence, iron, or even arsenic, may be indicated.—*American Journal of Medical Sciences*, May, 1893.

MEDICINE AND PATHOLOGY.

By ALBERT ABRAMS, M. D., Demonstrator of Pathology, and Adjunct to the Chair of Clinical Medicine, Cooper Medical College, San Francisco, Cal.

The Cause of Death after Extensive Burns.—DR. J. KIJANITZIN maintains that, after extensive burns, there is found in the blood. organs and urine a ptomaine, which is not present in the healthy organism. Toxicological investigations with this ptomaine on animals show it to produce paralysis of the extremities and heart. Atropine is antidotal to this ptomaine. The writer parenthetically refers to the observations of Hutchinson and Lustgarten regarding the beneficial action of belladonna and atropine in burns. The following symptoms after burns are attributed alone to the development of a ptomaine, viz: fall of temperature, weak action of the heart, slow and superficial respiration, diarrhea, vomiting, somnolence and apathy. The ptomaine is developed from the blood and tissues which have been altered by exposure to the high temperature. It is furthermore contended that the cause of death after burns is due to a ptomaine, which, according to its physiological action (particularly of the heart), belongs to the same group as muscarin, neurin and peptotoxin.—*Virchow's Archiv.*, Bd. 737. Hft. 3.

The Bacteriological Diagnosis of Cholera.——PFEIFFER (*Deutsch med. Woch.*, No. 36, 1892), considers the following necessary for diagnosis: (1) The microscopical examination of the dejections is to be carefully made in all suspected cases, although an examination of this kind alone does not suffice in the diagnosis of cholera. (2) In all cases where the symptoms are strongly suggestive of cholera, confirmation of the diagnosis should be sought by culture experiments. (3) In the average case of cholera it is possible to make the diagnosis with certainty within 24, or at the latest 36, hours. (4) All other methods thus far recommended, with the exception of the method of Schottelius, are of no value in the diagnosis. [*Method of Schottelius.*—The suspected stool is mixed with an equal quantity of alkaline meat broth and placed in an open glass for 12 hours at a temperature of 30° to 40° C. The bacilli rapidly develop on the surface, and are then examined under the microscope after straining.—A. A.]

LASER (*Berlin. klin. Woch.*, No. 32, 1892), recommends the following practical procedure in diagnosis: A number of glasses containing pepton-bouillon on pepton-gelatin are inoculated with the suspected feces; at the same time similar inoculations are conducted with unsuspected feces. After the glasses remain in the incubator for 24 hours it is possible to make the diagnosis by aid of smell. The glasses, if they contain the cholera bacilli, impart a stinking odor. The diagnosis is, however, only rendered certain when the glasses containing the bacilli show a pellicle on their surface, and when, after 48 hours, the cholera-red reaction can be obtained.—*Centralblatt f. klin. Medicin.*

MENTAL DISEASES AND MEDICAL JURISPRUDENCE.

By A. W. HOISHOLT, M. D., Assistant Physician, State Asylum for Insane,
Stockton, Cal.

The Growth of Memory in School Children.—DR. T. L. BOLTON has tested the memory span in some 1,500 school children of various grades. His test consisted in dictating to them series of digits. A statistical study of the written records of this dictation has enabled him to draw the following interesting conclusions: The extent of the memory span for the pupils of the public schools is six digits. The memory span increases with age rather than with the intelligence measured by the grade of studies pursued. A good memory span is not necessarily associated with intellectual acuteness, as measured by class-room rank. The girls have a longer span than the boys. When the series is too long to be perfectly remembered, the digits forgotten belong to the middle of the series; *i. e.*, it is the ends of the series which are best remembered. In the process of being forgotten, the memory images suffer first a confusion as to the order in which they occur, then the digits are lost and wrong ones substituted for them, and finally digits are lost without any attempt at substitution. These tests yield as good results at the beginning of the day as at the end, showing that the pupils have not been fatigued for this particular kind of work by the school exercises of the day.—*American Journal of Psychiatry—Journal of Nervous and Mental Disease.*

Prolonged Feeding by the Stomach-Tube.—DR. YELLOWLEES, of the Glasgow Royal Asylum, reports a case where this mode of feeding was kept up for a period of eight years and eight months. A lady, aged forty-four, was admitted in January, 1876, laboring under melancholia, with delusions of dread and suspicion, especially that her food was poisoned. In September of the same year her refusal of food became so obstinate and her resistance so determined that it was necessary to resort to the stomach-tube. She would allow the food, when given to her with a spoon, to pass into the air-passages rather than yield; she was fed with the tube three times daily, till May, 1885. The obstinacy in the refusal of food was put an end to almost by accident. On a certain day another attempt was made to feed her with a spoon, when, in the struggle which followed, her chair was tilted backwards, which made her fear that she was falling, and for a moment she forgot to resist and suddenly swallowed the spoonful of beef-tea that had been put in her mouth. She seemed surprised and shocked, but the advantange once gained was followed up; she was slowly, but gradually, made to swallow all the beef-tea, which had been prepared for the tube, and was then told that, having taken it once, she must take it always. She was finally made to use the spoon with her own hand, and an uninterrupted, though slow and gradual, recovery resulted. She was discharged, recovered, in February, 1891, after a residence of over fifteen years. She is still quite well, and the recovery seems not only complete, but permanent.—*American Journal of Insanity.*

Treatment of the Insane in Bed.—A paper on this subject was read by DR. BROSIUS at a meeting of the Dutch Psychiatric Society. He took the ground that rest in bed was of the greatest benefit in all forms of acute insanity. It would appear, however, from the discussion which followed that it is customary there to treat melancholia in this manner, but that cases of mania were not generally treated by rest in bed.—*Centralblatt f. Nervenkrankheiten—Dublin Journal of Medical Science.*

FORMULÆ.

By Geo. B. Somers, M. D., San Francisco, Cal.

Injection of Cafein.—Cafein increases arterial tension in cardiac collapse, and replaces, with great advantage, injections of ether, which are very painful. Huchard prefers the following formulæ:

I. Cafein	ʒi
Salycilate of soda	gr. xl
Water	ʒiss

Dissolve by means of heat. Inject 10 or 15 minums.

II. Cafein	
Benzoate of soda	āā ʒi
Phosphate of soda	ʒii
Distilled water	℥iii

Inject one drachm at a time. Each drachm contains 10 grains phosphate of soda and 5 grains of cafein. It is useful in tedious convalescence from pneumonia, fever, etc.—*Medical Press.*

For Irritable Cough.—The *Practitioner* gives the following:

Acidi hydrocyanici dil.	ʒiss
Morphinæ acetatis	gr. iss
Mucilaginis acaciæ	℥i
Syr. pruni virgin.	℥iv
Aquam *ad*	℥vi

S.—Teaspoonful to be sipped every four or six hours.—*Boston Medical and Surgical Journal.*

Chronic Bronchitis.—Ferrand employs:

Purified tar	gr. xv
Dover's powder	gr. xxii
Powdered benzoin *q. s.* to make 20 pills.	

S.—One to four each day.—*Therapeutic Gazette.*

Diphtheria.—Waugh relies on the following mixture, which he says should be prepared exactly as directed in order to evolve in the solution, nascent chlorine gas:

Potasii chloratis pulv.	ʒi
Acidi hydrochlor. U.S.P.	ʒiss
Misce et adde:	
Tr. ferri chloridi	ʒii
Aq. *q. s. ad*	℥iv

S.—A teaspoonful every two hours, undiluted.—*Times and Register.*

Aphthæ.—Croft gives:

Chlor. potash	ʒss–i
Honey	℥ss
Water	℥ii

S.—Teaspoonful every two hours.—*Medical Age.*

Worm Powders.—Moister uses the following:

I. Santonin	gr. 10
Calomel	gr. 15
Scammony, resin, powd.	gr. 15
Powdered sugar	gr. 30

Mix and divide into 15 powders. Give one 3 times daily (on an empty stomach) for one day, and repeat in three days if necessary.

II. Santonin	gr. 10
Podophyllin resin	gr. 4
Powdered rhubarb	gr. 15
Sugar of milk	gr. 30

Mix and divide into 15 powders. Give powders 5 hours apart (on an empty stomach) until three have been given. Omit a day, repeating the dose if necessary.

PUBLIC HEALTH.

By W. R. Cluness, M.A., M.D., San Francisco, Cal.

Mortality for June.—The deaths registered in 98 town districts of the State during the month of June, in a population of 826,094, correspond to an annual rate of 13.92 a thousand; the total mortality having been 963. 111 deaths were due to zymotic diseases, giving an annual rate of 1.60 a thousand; of these, 15 were due to diphtheria, 23 to cholera infantum, 35 to typhoid fever, 15 to diarrhea and dysentery, 8 to cerebro-spinal fever, 4 to whooping cough, 4 to croup, 4 to remittent and intermittent fevers, 7 to scarlet fever, 1 to measles, and 0 to small-pox. 238 deaths resulted from diseases of the respiratory organs, giving an annual rate of 3.42 a thousand; of these, 146 were due to consumption, 67 to pneumonia, 23 to bronchitis, and 2 to pulmonary congestion; the rate being, for consumption and pneumonia, 2.11 and .97, respectively. 71 deaths resulted from diseases of the heart, 8 from alcoholism, 1 from erysipelas, 29 from cancer, and 439 from causes not given. The average annual death rate from all causes occurring in the ten largest cities and towns in the State, and representing a population of 579,500, was 15. The highest rate for the month, occurring in cities having a population of 10,000 or more inhabitants, was reported from Alameda; the lowest from San Diego.

Enteric Fever in Oakland.—Notwithstanding the intelligent manner in which the cause of the recent epidemic of enteric fever in Oakland was discussed by the press, there has nevertheless occasionally cropped out such evidence of ignorance upon the subject as may be profitable to endeavor to correct. The universally accepted opinion of medical observers upon the subject, that it is a specific form of fever which can only be introduced into the system by means of the alimentary canal, would appear to be tolerably well proven by the fact that its germ has never been found in any of the secretions of the system excepting those of the bowels. It can never become active in any other portion of the system any more than cholera can be communicated by inhalation or exposure to an infected individual. The alkaline soil contained in the alimentary canal beyond the stomach can alone favor the development of the specific germ within the human system. The view of the late Dr. Murchison that it can be produced *de novo* by the decomposition of sewage is not tenable, otherwise a specific something could be generated spontaneously. Were this true, small-pox, for example, could be generated by certain combinations. What those combinations would, even with remote possibility, be, we will not undertake to speculate upon, but if one specific form of fever can thus be generated, so can another, and so on throughout all forms of disease and processes of nature. On the contrary, however, the evidence is overwhelming that it cannot be thus generated, but that every case is of necessity due to the taking into the system of a specific germ which must be the product of the disease in another. That the germ undergoes certain changes and acquires virulence after its elimination from the system, there can be but little doubt, and that heat and accumulation in stagnating and illy-ventilated privies and cesspools, hasten and intensify this virulence is equally certain, but that such accumulations of filth without the introduction of the specific germ can generate enteric fever is just as unreasonable as to say that the summer heat of the Sacramento or of the San Joaquin Valley can generate yellow fever without the introduction of the specific germ of that disease. If exposure to the emanations of sewer gas could cause the development of enteric fever, how is it that the majority of those thus exposed escape, and that doctors, nurses, relatives, and attendants upon those ill of the disease are not more generally attacked? Evidently because the disease cannot be thus communicated; because there is not a typhoid germ in the sick-room outside of the alimentary canal of the patient, provided proper precautions have been taken to disinfect and remove the alvine evacuations; because they are never found in the urine; because they are not present in the respiratory apparatus and hence cannot be given off therefrom, and because they do not and cannot exist in any other part of the human system than the alimentary canal. Undoubtedly enteric fever is almost invariably communicated to the system by means of the drinking water, but however much it may be contaminated with sewage, the disease cannot be developed by its use unless the germ be first introduced, then an epidemic is sure to arise. In the case of Plymouth, Penn., a thousand of its inhabitants, out of a population of ten thousand, were suddenly attacked with typhoid fever, which was unmistakably due to the contamination of the drinking water by the excreta of a typhoid patient a few miles above the intake of the supply. In a small inland town in England, not many years since, the source was clearly traced to the washing of milk-pans and the dilution of the milk with water similarly contaminated. In neither of these instances, so far as has been ascertained, was the disease communicated to the medical or other attendants by reason of such attendance, or to any individual other than those who drank of the contaminated water or milk. Invariably, also, when typhoid fever has resulted from the drinking of well-water, the germ has been traced to a neighboring privy into which the evacuations of typhoid patients had been emptied, and thence had found access by percolation to the well, showing clearly that the popular idea of the purifying influence of the soil is erroneous. Whole families have thus been poisoned by drinking the water from contaminated wells. Unfavorable hygienic surroundings doubtless intensify an already existing predisposition, but no amount of unhygienic influence can generate a specific form of disease unless its special germ be implanted therein. And so with the Oakland sewers, drinking water, and milk; neither contains the typhoid germ, nor can that germ be generated therein *de novo,* however foul and villainous the compound; but the seed having 'been once planted therein, it usually finds favorable soil for its rapid multiplication. When from defective plumbing, or other cause, it obtains access to the drinking water, and thence to the intestinal canal of susceptible individuals, typhoid fever follows. Undoubtedly, therefore, a thorough examination of the cases of enteric fever that have recently occurred in Oakland would show that the drinking water had become contaminated by typhoid germs, which were the product of a previous case of the same form of disease, and that the defective sewers merely acted as a predisposing influence in rendering those who swallowed the germs less able to digest or otherwise resist their specific influence.

METEOROLOGY.

Summary for June.—*Temperature.*—The normal temperature of the State for June is 71°; the mean for June, 1893, was 70°; a departure from the normal of- 1°. The highest monthly mean was 104.8°, at Volcano Springs, in the desert regions of San Diego county and 223 feet below sea level; the lowest 47.5°, at Cisco, in the mountain regions of Placer county, 5,939 feet above sea level and 6,162 feet above Volcano Springs, where the highest temperature was recorded. The maximum was 121°, at Volcano Springs, on the 7th; minimum, 32°, at Cisco, on the 13th and 14th. The greatest monthly range was 70°, at San Ardo; the least, 11°, at Poway.

Rainfall.—The normal precipitation for the State for June is 0.31 inches, and the average for June was 0.01 inches, a departure from normal of - 0.30 inches. The greatest monthly precipitation was 0.91 inches, at Crescent City, and the least, nothing, over the greater portions of the State.

Wind.—The prevailing direction of wind was westerly.

Unusual Features.—The unusual meteorological feature of the month was its low mean temperature as compared with the usual temperatures for this month. —JAMES A. BARWICK, Director California Weather Service.

California—Tabular Statement for June, 1893.

STATIONS.	TEMPERATURE.						RAINFALL.		Mean Relative Humidity	WEATHER.			WIND.	FURNISHED BY—
	Mean.........	Highest	Lowest.........	Mean Highest	Mean Lowest	Mean Daily Range	No of Days Rain Fell......	Total Rainfall.........		No. of Clear Days.....	No. of Fair Days.........	No. of Cloudy Days.........	Prevailing Direction.	
Auburn ....Cal.	71.0	95.0	53.0	------	------	------	0	0.00	------	----	----	----	N.W.	Southern Pacific Company.
Berkeley......... "	58.8	96.0	46.0	71.8	50.1	21.7	0	0.00	74.0	19	5	6	S.	Obs. University of California.
Colfax........... "	69.1	94.0	44.0	------	------	------	0	0.00	------	----	----	----	S.E.	Southern Pacific Company.
Eureka.......... "	54.0	69.0	43.0	------	------	------	3	0.33	------	11	11	8	N.W.	Weather Bureau Dept. Agr.
Fresno.......... "	73.0	103.0	49.0	90.5	56.0	34.5	0	0.00	39.0	30	0	0	N.W.	" " "
Keeler. .... "	76.0	94.0	51.0	89.2	62.0	27.2	----	------	20.0	29	0	0	S.W.	" " "
Los Angeles.... "	66.0	90.0	48.0	78.5	53.7	24.8	2	0.03	74.0	16	14	0	W.	" " "
Monterey .... "	56.9	70.0	50.0	------	------	------	0	0.00	------	----	----	----	N.W.	Southern Pacific Company.
Napa........... .. "	64.0	90.0	47.0	77.2	50.9	26.3	0	0.00	49.0	30	0	0	S.	Station Napa Insane Asylum.
Oakland......... "	62.3	91.0	47.0	72.5	50.8	21.7	0	0.00	80.0	24	5	1	W.	Chabot University.
Paso Robles.... "	70.7	102.0	49.0	------	------	------	0	0.00	------	----	----	----	N.	Southern Pacific Company.
Red Bluff....... "	73.0	101.0	51.0	87.7	59.2	26.5	0	0.00	37.0	30	0	0	N.W.	Weather Bureau Dept. Agr.
Sacramento. ... "	68.5	95.0	48.0	82.8	54.2	28.6	0	0.00	63.0	30	0	0	S.W.	" " "
San Bernardino "	71.0	98.0	46.0	90.4	51.7	38.7	0	0.00	66.0	28	1	1	W.	A. K. Johnson, M. D
San Diego....... "	63.4	75.0	53.0	69.7	57.2	12.5	1	T.	79.0	17	9	4	W.	Weather Bureau Dept. Agr.
San Francisco.. "	56.0	90.0	47.0	63.7	49.3	15.1	2	0.03	76.0	29	1	0	S.W.	" " "
Santa Barbara.. "	62.2	86.0	49.0	70.9	53.4	17.5	0	0.00	72.0	27	2	1	S.E.	Hugh D. Vail.
Santa Cruz...... "	60.4	87.0	42.0	78.9	------	------	1	T.	------	29	1	0	W.	W. R. Springer.
Yuma...........A. T.	87.1	111.0	57.0	104.6	69.6	35.0	1	T.	35.0	28	2	0	W.	Weather Bureau Dept. Agr.

T. means a trace of rain. Blank (----) indicates data missing.

Occidental Medical Times.

COMMUNICATIONS are invited from all parts of the world. When necessary to elucidate the text, illustrations will be furnished without cost to the author.

SACRAMENTO: AUGUST, 1893.

MEMBERSHIP IN THE AMERICAN MEDICAL ASSOCIATION.

"This is obtainable, at any time, by a member of any State or local Medical Society which is entitled to send delegates to the Association. All that is necessary is for the applicant to write to the Treasurer of the Association, Dr. Richard J. Dunglison, Lock Box 1274, Philadelphia, Pa., sending him a certificate or statement that he is in good standing in his own Society, signed by the President and Secretary of said Society, with five dollars for annual dues and subscription for the *Journal.* Attendance as a delegate at an annual meeting of the Association is not necessary to obtain membership. On receipt of the above amount the weekly *Journal* of the Association will be forwarded regularly."

The need for organization of local societies is therefore apparent, and it is none too soon for efforts to be made in this direction. In accepting membership in the Local or State Society, as its qualification, the Association has for years taken the ground recently adopted by the Medical Society of the State of California. The onus of determining the professional fitness of an applicant is thrown upon the locality where he is best known, and upon presentation of the proper certificate there is no further question as to his eligibility. California is now ahead of most of the States in the possession of a more perfect organization. The present loophole in the Constitution of the National organization, is the dual portal of admission, and this the proposed Constitution endeavors to remedy by providing that members can only join from a State Society. The Local Society is the great factor of importance to the profession, and in States where membership in a local society is not a prerequisite of membership in the State Society, the American Medical Association has at present no authority to uphold the "unit of professional organization."

THE RECENT EPIDEMIC OF TYPHOID FEVER IN OAKLAND.

On June 21st, 1893, DR. J. H. TODD reported to the health office of Oakland several cases of typhoid fever, located in the northern part of the city; he also stated that all of them had been obtaining milk from the same dairyman. The Board of Health, acting upon this information, ascertained that the milk came from Reyes' ranch, near Temescal creek. The cows, 80 in number, were owned by three men, who sold their milk to the Vernon Park and Pacific (Reyes) dairies, who in turn retailed it through Oakland and suburbs.

The ranch was examined on Saturday, June 24th, by Health Officer F. L. Adams, Sanitary Inspector Smith, and Veterinary Surgeon F. E. Pierce. They found no disease among the cows, though the ranch was in a most filthy condition. Reyes and an employe, in different houses on the ranch, had been sick for several weeks with typhoid fever. The evacuations had been thrown out carelessly on the ground. Water to wash cans and to adulterate milk was taken, usually, from a small creek which ran near these houses, and occasionally from a well on the hillside below the yard. The water from the creek was piped into a tank near the well. Chickens and cows had free access to the creek.

On June 26, the Health Officer sent samples of the tank and well water to Prof. Colby, of the State University, for examination, and on the 28th he made the following report:

	Solid residue at 100° C.	Chlorine.	Ammonia. Free.	Ammonia. Albuminous.	Oxygen consumed in moist combustion.
Well	25.8	.49	.20	.076	2.50
Tank	25.1	.65	1.07	.571	9.20

The analysis of the well water shows it to be safe for domestic and drinking purposes; that of the tank shows it to be absolutely unfit for the above purposes. The organic contamination, as indicated by the ammonia and oxygen, rates some ten times higher in the tank water than is named for a first-class drinking water.

On July 3d, at the instance of the Oakland health department, Dr. S. M. Mouser, of San Francisco, obtained samples of the tank, well, and creek water at the Reyes place, on which he subsequently reported as follows:

No. 1, tank—Bacteria abundant, amounting to some thousands in a cubic centimetre of water. Several colonies which were suspected of being composed of the microörganisms generally believed to be the cause of typhoid fever were found, and after many cultivations in different media, I believe to be typhosus. No. 2, dam—Abounds in bacteria, almost as numerous as No. 1. Although several cultures were made, I failed to find what seemed to be the bacillus of typhoid. No. 3, bed of creek—This specimen was obtained from the bed of the creek below the dam and source of the tank supply, and in the immediate vicinity of several small dead animals. It was literally reeking with filth and swarming with bacteria. After making one culture of it, and finding that it would be an endless task to separate the different forms, and as it had no direct bearing on the tank supply, I abandoned it. No. 4, well—This specimen was from a well in the immediate vicinity, from which water is sometimes pumped into the tank. It was remarkably free from microörganisms, and, from a bacteriological standpoint, could not be considered bad.

While dairies, sewers, and other conditions in the city affecting health were being investigated, the Health Officer, at his own request, was sent reports of existing typhoid and malarial cases from the Oakland physicians, with the following result: First 14 days of June, 2; next 8 days, 44; 23d, 13; 24th, 23; 25th and 26th, 79; 27th, 10; 28th, 31; 29th, 24; 30th, 75; July 1, 25; 2d and 3d, 11; 4th, 8; 5th, 6; 6th, 5; 7th, 9; 8th, 1; 9th and 10th, 6; 11th, 0; 12th, 4; 13th, 14; 14th, 1; 15th, 2; 16th and 17th, 2; 18th, 4; 19th, 2—total, 399, as taken from report cards, but subsequent corrections (duplicates) reduced the number to 391. Of these 362 cases reported up to July 12th, 265 were given as typhoid, 42 typho-malaria, 36 malarial, gastric, intermittent, remittent, continued, and doubtful—a total of 19. The water supply to the 362 was: to 26 well water, to 3 Piedmont Water Company, and to the remainder, Contra Costa Company. Defective plumbing of some kind was found in 121 cases. The milk supply was: 3, none; 21, unknown; 24, private sources; 86, thirty-four different dairies; 288, REYES' ranch.

The total number of cases of typhoid and malarial fever in Oakland reported in June and July, 1892, was: typhoid, 15; malarial fever, 8; or a total of 23, as opposed to 391 during less than five weeks of June and July, 1893. The total number of cases in Oakland reported from July 1, 1891, to June 30, 1892, was: typhoid, 110; malarial, 57. Deaths: typhoid, 28; malarial, 6. The deaths among the 391 cases this year, were 20 inside the city, and 11 outside, of persons who contracted disease inside the city. Among the 391 cases reported this year, from June 14 to July 19, inclusive, were 15, in which the disease was contracted outside the city.

The comprehensive and thorough investigation conducted by the health department of Oakland shows that the epidemic of typhoid fever in Oakland in June and July, 1893, was mainly due to the condition of the milk received from the REYES ranch—to the infected character of the water used there to wash the cans and to adulterate the milk, and on June 29th a resolution stating that the milk supply was the principal cause of the trouble was unanimously adopted by the Oakland Board of Health.

The chart record of the Oakland Health Officer, which at date has not been completed, shows that 157 cases were west of Adeline street, mostly at "The Point;" 142 east of Adeline street, 71 of them north of Tenth street, and 71 south of it. There were but 6 east of Lake Merritt. The monthly service of the Vernon and Pacific Companies was somewhat cheaper than that of other milk purveyors, so that it was mainly taken by people of small means. Of the 20 cases in which death occurred within the city, the milk supply in 12 had been from the REYES farm; and in the 11 which occurred outside the city, in 7 it had been from the same source. In 8 of the 20 cases above mentioned, the plumbing of the premises was also in some way defective.

The investigations by the Oakland health department also developed the fact that nearly, if not quite, all the milk sold in Oakland is adulterated with water before it reaches consumers. One dealer, when confronted with the result of a test of his milk for specific gravity, claimed that he only put "about one-sixth" of water in his milk, while some other dealers put in "one-third." The question of water supply of dairies would, therefore, appear to be one of great public importance.

AN EXAMPLE OF TRADE JOURNALISM.

A remarkable example of inconsistency, as well as an instance of unmitigated impudence, is to be found in a recent issue of a trade circular issued by E. Merck & Co., of Darmstadt. It is entitled the "Nostrum Cancer," which the writer asserts "is eating its way into the tissues of our nation's organism" The publisher of the circular then proceeds to invite the opinion of the profession on this burning question, and views of various authors, several of whom have been, or are, pharmacists, are given in support of the position of the bulletin. A crusade of this kind, if undertaken in good faith, and if directed against dangerous patent medicines or useless quack remedies, would be exceedingly laudable, but closer perusal shows that the real purpose is an attack on many preparations upon which the profession has already set the seal of its approval, and incidentally the laudation of the inimitable products of the only Merck, as manufactured at his prehistoric factory.

We shall not here discuss the ethics of patented or of proprietary preparations, or of trade journals, as these subjects must be dealt with at greater length. We desire only to point out the impudent inconsistency of the trade circular and the peculiar mental perversion that permits reputable houses to patronize its pages. The editor of "M. B." says: "No one should forget, however, that *the first step* toward helping the fight along is *to help those who fight it;* by patronizing *those few* PROFESSIONAL JOURNALS which have the courage of declaring their convictions on this topic and of *living up* to them by refusing all patronage from the nostrum interest! *Also*—by attentively reading those journals which *truly educate* instead of corrupting—the profession will become less amenable to the charge of 'ignorance' on recent developments in their science.'' The display type is reproduced so as not to diminish the strength of the original. Correspondents are invited to express their opinions ''without fear or favor'' on the following questions: (1) *How* is the NOSTRUM CANCER *fed and spread* to-day? (2) *How* can we hope to *root it out?* In reply to these queries are several letters, most of which seem to be from pharmacists, discussing the subject from various aspects, the general drift being that the modern doctor is too lazy or too ignorant to write his prescriptions as he should. The retail prescription pharmacist has a chronic and commercially well grounded objection to specialties and proprietary articles of any kind. Through their use he is compelled to keep in stock a variety of pills, elixirs, and syrups, that would never appear on his shelves but for the specification on the prescriptions of physicians. This involves a considerable outlay, a good deal of waste, and a reduction in profit, on account of the fact that the manufactured article costs more than the crude material, and that the time of principal or assistant, drawing salary, goes on just the same. The animus of the correspondents is, therefore, in a measure explained.

One of these who is of the opinion that ''physicians, journals and colleges share in the blame,'' writes: ''Is it not often the case that, after sharply reprimanding the patient for his faith in such nostrums, the physician deliberately sits down to prescribe 'Tongaline,' 'Celerina,' or some equally proprietary article of whose composition and virtues he knows only what the advertising columns of certain medical journals tell him?'' It would, therefore, appear that tongaline and celerina are equally odious with the ''cough syrups'' and ''sarsaparillas'' to which this writer had already alluded. They are ''nostrums'' and the editor of ''M. B.,'' if he lives up to his principles, should refuse all patronage from the ''nostrum interest.'' Turning to page 20 of his ''trade announcements,'' we find that the manufacturers of tongaline are paying for one quarter of a page, for the privilege of having mud thrown at them in another column by a sheet that scorns their patronage but accepts their dollars. Looking over these ''trade announcements,'' we find that not less than nine pages out of twenty-four are filled with the advertisements of proprietary articles. We are glad to note that ''celerina'' is not to be found there, nor is bromidia, an American proprietary preparation that is selling extensively on the other side of the Atlantic. There are, however, enough reputable manufacturers to make us wonder at the reasons that can permit such a disastrous investment.

Where the formula is given, there is very little distinction, from an ethical stand-point, between a patented and a proprietary preparation. The manufacture of a large number of articles by the Darmstadt firm is effectually protected, and the sale of these articles on this side is also limited to a licensee as the "sole agent" in this country for these preparations. In the case of antipyrin, not long since an American manufacturer undertook to make a pain reliever and to sell it, but because the name appeared to conflict with its foreign prototype, he was compelled to change it for the rather uneuphoneous title of "antisparalgos." This preparation will accomplish the same results as are obtainable with antipyrin, and the profession know just as much about it as of the foreign article. It is unnecessary to pursue this subject further. The proper course for physicians to adopt is to avoid patronizing those so-called journals that are published for the sole purpose of pushing the wares of the manufacturer who pays the bills, and incidentally of decrying anything in his line not bearing his name. As for the manufacturer who pays for the privilege of having his wares abused by a concern that holds him up to vilification, we respectfully suggest that he can get the abuse for nothing and that he can spend the money to better advantage elsewhere.

NOTES.

Revision of the Constitution and Code of Ethics of the American Medical Association.

The question of revision of the Constitution and Code of Ethics of the American Medical Association, that will come up for consideration at the meeting in San Francisco in 1894, is one of greatest importance to the Association. It should be carefully studied by all who have the interests of our organization at heart, for much will depend on the course adopted. We propose to devote space from time to time to presenting the reasons for and against changes that may be beneficial to the profession. Meanwhile, for the purpose of enabling all who will vote on the question to do so intelligently, the majority and minority reports on Constitution and Code, that have already appeared in these columns, will be republished for some months, and can be found in each issue following the last page of the number. The reports will be paged separately, and can be detached if desired. The Code of Ethics, as it now stands, can be found in every issue of the Medical Register of the State of California. It can also be obtained in pamphlet form for a few cents by addressing the Editor of the *Journal*, at Chicago. Copies of the Constitution can be obtained from the same source.

The Griffes Murder Case.

The main facts of this strange and horrible crime have already been published with ghastly emphasis by the daily papers. The tragedy occurred on the night of June 28, 1893, in the back room of a saloon on the water front of San Francisco. The evidence at the inquest showed that Mrs. J. H. Griffes had visited the saloon in company of a man named O'Neil, an iron-molder. Some four hours later she was found in a dying condition, though her companion had departed but a few minutes previously. At the autopsy, made the same day, the following facts were developed: The height was 5 feet 4 inches; weight, about 150 pounds. On external inspection a slight abrasion was found on the left shin below the knee, and several small contusions on the right arm near the flexure surface of the elbow, also a small contusion on the left cheek. In the perineal region a small lacerated wound appeared on the right buttock close to the anus. From another wound, involving the perineal body, about eight inches of rectum protruded. This wound extended from the posterior wall of the rectum behind through the anterior wall and completely through the length and depth of the perineal body into the vagina, and penetrating the abdominal cavity behind the uterus into Douglas' pouch. On internal inspection, the heart, liver, kidneys, spleen, and lungs were normal, excepting that they were greatly exsanguinated. The internal aspect of the rectum showed two wounds, one a circular lacerated wound, the other a tear about three inches in length, extending through the lower portion of the anterior rectal wall. A number of leaves, flower stems, and rose leaves were found in the abdominal cavity, lying upon the intestines just below the transverse colon. In the pelvic cavity a number of lacerations of the soft parts was found, besides a laceration of the right internal iliac artery. The cause of death was hemorrhage from these injuries. On the floor of the room, which deceased had occupied with her companion, was found a bouquet of roses that had been seen with the unfortunate woman. The stems of the flowers had been gathered around a small stick and then secured. The stick and the flower stems were stained with blood. This evidence, and other facts taken with the terrible injuries sustained by the woman, go to show that her assailant forced the flower stems secured around the stick into the vagina and thence into the abdominal cavity, following them with the hand.

Alleged High Fees in the Mackay Case.

It will be remembered that some months ago Mr. John Mackay, the California multimillionaire, was severely wounded in the back by a pistol bullet fired at short range by a crank, who immediately attempted to end his own life. Dr. J. W. Keeney and Dr. J. F. Morse, of San Francisco, were in attendance, the latter in consultation. Upon Mr. Mackay's recovery, bills were duly rendered, Dr. Keeney's being $7,500, and that of Dr. Morse $5,000. Mr. Mackay regarded the amounts as excessive, and declined to pay. Suits were commenced, but a compromise was subsequently effected, the bills being reduced to $5,-

000 and $3,000. There has been a good deal of comment on this case in the lay press, and medical journals have noticed it without much knowledge of the circumstances governing the case. It appears that Dr. Keeney, who saw Mr. Mackay within a few minutes of the shooting, attended him for one month and eleven days. During this period a great deal of time was devoted to the case, the medical attendant frequently remaining all night. The wound progressed favorably, but an intercurrent complication of appendicitis caused much trouble, at one time becoming so serious as to imply a radical operation which, we understand, was actually contemplated. We have no sympathy whatever with the idea that because a man is wealthy he should be the victim of extortion. But when a man of great wealth is in imminent danger of his life, under circumstances that require the greatest possible care and the closest attention, it certainly seems reasonable that he should contribute a proportionately slight pecuniary acknowledgment of gratitude for his recovery. A few additional years of life can hardly be estimated in dollars, nor, perhaps, can the climate of California be lightly exchanged for any other. The regrettable feature in the whole matter was the compromise. This tax on professional good nature is becoming too common, and if charges in proportion to the services rendered and the responsibilities involved were more frequently made, we would hear less complaint of excessive fees. In this connection it is exceedingly interesting to note that Mr. Mackay, as one of the executors of the will of the late Mrs. Fair, was allowed $26,000, though the services were probably merely clerical. Judge Mesick, in the same case, as attorney for the estate, received $20,000 for the responsibility and about fifteen minutes in Court. We do not regard these fees as excessive, and have no doubt that they were cheerfully paid by the heirs. The contrast, however, between $12,000 and $46,000 is very suggestive, especially when it is remembered that the former sum was scaled down to $8,000. Assuming, therefore, a parity in skill between financier, and attorney, and physician and surgeon, and that an equal amount of labor was performed in each case, we find that the value of Mr. Mackay's life is to Mrs. Fair's estate as 4:23; on which showing comment is needless.

Standing Committees of the State Medical Society.

The following are the Standing Committees of the Medical Society of the State of California, for 1893–94:

Committee on Clinical Medicine, including Diagnostics and Therapeutics.—Albert Abrams, San Francisco, Chairman; G. G. Tyrrell, Sacramento; C. M. Fenn, San Diego; Washington Dodge, San Francisco; C. E. Blake, San Francisco.

Surgery and Clinical Surgery.—E. H. Woolsey, Oakland, Chairman; G. J. Fitzgibbon, San Francisco; L. Bazet, San Francisco; R. Caldwell, San Jose; G. F. Shiels, San Francisco.

Pathology and Pathological Anatomy.—D. C. Barber, Los Angeles, Chairman;

W. F. Wiard, Sacramento; A. W. Hoisholt, Stockton; J. H. Barbat, San Francisco; A. G. Anthony, Oakland.

Diseases of the Mind and Nervous System.—Wm. S. Whitwell, San Mateo, Chairman; Leo Newmark, San Francisco; E. W. King, Ukiah; H. N. Rucker, Oakland; J. W. Robertson, San Francisco.

Medical and Surgical Diseases of Children.—H. M. Sherman, San Francisco, Chairman; E. S. Meade, San Jose; E. A. Follansbee, Los Angeles; F. W. D'Evelyn, San Francisco; K. I. Howard, San Francisco.

State Medicine and Hygiene and Adulteration of Foods and Drugs.—M. M. Chipman, San Jose, Chairman; David Powell, Marysville; R. F. Markell, Cloverdale; J. U. Hall, Jr., San Jose; H. D. Robertson, Yreka.

Gynecology.—W. H. Mays, San Francisco, Chairman; Luke Robinson, San Francisco; W. A. Briggs, Sacramento; J. A. Owen, Red Bluff; A. Liliencrantz, San Francisco.

Obstetrics and Puerperal Diseases.—H. H. Hart, San Francisco, Chairman; P. M. Lusson, San Jose; E. N. Foote, Lockford; John M. Forrest, Alturas; Jas. Frost, San Francisco.

Histology and Microscopy.—Jas. R. Curnow, San Jose, Chairman; L. T. Ellis, Los Angeles; K. D. Shugart, Riverside; T. J. Le Tourneux, San Francisco; J. H. Stallard, San Francisco.

Indigenous Botany, Materia Medica, Pharmacy and Medical Chemistry.—W. P. Gibbons, Alameda, Chairman; Washington Ayer, San Francisco; D. C. Bellamy, Covelo; J. H. Bullard, Anaheim.

Publication.—A. P. Woodward, San Francisco, Chairman; S. R. Mather, San Francisco; H. E. Sanderson, San Francisco; Wm. Watt Kerr, San Francisco.

Medical Topography, Meteorology, Endemics and Epidemics.—W. J. G. Dawson, St. Helena, Chairman; J. R. Laine, Sacramento; H. D. Lawhead, Woodland; C. W. Nutting, Etna Mills; E. S. O'Brien, Merced.

Necrology.—Winslow Anderson, San Francisco, Chairman; F. D. Bullard, Los Angeles; W. W. MacFarlane, Davisville.

Prize Essay.—A. H. Pratt, Oakland, Chairman; C. E. Blake, San Francisco, T. B. De Witt, San Francisco.

Dermatology and Venereal Diseases.—D. W. Montgomery, San Francisco, Chairman; M. Regensburger, San Francisco; H. W. Yemans, San Francisco; B. A. Plant, Santa Cruz; J. A. McKee, Elk Grove.

Ophthalmology and Otology.—Wm. D. Babcock, Los Angeles, Chairman, W. F. Southard, San Francisco; W. A. Martin, San Francisco; E. S. Clark, San Francisco; G. C. Pardee, San Francisco.

Laryngology and Rhinology.—A. Barkan, San Francisco, Chairman; J. D. Arnold, San Francisco; G. W. Merritt, San Francisco; T. F. Rumbold, San Francisco; H. L. Wagner, San Francisco.

Medical Jurisprudence.—G. W. Davis, San Francisco, Chairman; G. W. Westlake, Red Bluff, J. L. Ross, Redwood City; J. R. Medlock, Santa Ana.

Medical Education and Medical Legislation.—W. S. Thorne, San Francisco, Chairman; Thos. Ross, Woodland; Walter Lindley, Whittier; H. S. Orme, Los Angeles; Emma S. Merritt, San Francisco.

Anatomy and Physiology.—W. B. Lewitt, San Francisco, Chairman; C. E. Cooper, San Francisco; J. A. Crane, Santa Ana; F. B. Carpenter, San Francisco; J. T. Cameron, Red Bluff.

Executive Committee.—Jas. H. Parkinson, Sacramento, Chairman; Lee O. Rodgers, San Francisco; W. Le Moyne Wills, Los Angeles.

Committee of Arrangements.—R. Caldwell, San Jose, Chairman; P. M. Lusson, San Jose; Jas. R. Curnow, San Jose; Thos. Kelly, San Jose; John Wagner, San Francisco, Secretary.

Special Committee on State Library.—Wallace A. Briggs, Sacramento, Chairman; Jas. H. Parkinson, Sacramento; G. L. Simmons, Sacramento; T. W. Huntington, Sacramento; Wm. E. Briggs, Sacramento.

SOCIETY PROCEEDINGS.

SACRAMENTO SOCIETY FOR MEDICAL IMPROVEMENT.

Regular Meeting, June 20, 1893.

The President, F. L. ATKINSON, M. D., in the Chair.

New Member.—THOS. ROSS, M. D., was duly elected a member of the Society.

Removal of a Foreign Body from the Vitreous by the Electro-magnet.—DR. W. E. BRIGGS exhibited a patient from whose eye he had removed a piece of steel that had lodged in the vitreous. The case had already been reported to the Society in a recent paper (MEDICAL TIMES, vol. vii, p. 183). At the time of operation there had been considerable sympathetic ophthalmia in the other eye which had now completely disappeared. The man had long since resumed work and vision was only slightly impaired.

DR. W. J. HANNA read a paper on "The Treatment of Acute Bubo."

DR. G. L. SIMMONS, JR., in opening the discussion, said: Of late, injections into these glands had proved very successful. Benzoate of mercury in a 1 per cent. solution was injected into the base of the tumor. Dr. Weilander had aborted the swelling in 90 per cent. of his cases. Odessa in 140 such cases had cured 87 per cent. They are most difficult cases to handle.

DR. J. H. PARKINSON: Where the glands are broken down we obtain the same result by curetting and packing. If suppuration is liable to occur after complete removal of the glands the result is not much better than that by free incision. He had had no experience with the radical operation.

DR. G. L. SIMMONS had never attempted the treatment by radical operation. In a general way he preferred the classification, sympathetic, specific and indurated, in these cases. He had noted the infrequency of the phagadenic form at the present time as compared with early days. He was quite sure that the character of the disease had changed. In the treatment of these cases he was in the habit of making a very free incision, curetting, and using the acid nitrate of mercury to get a healthy action.

DR. W. E. BRIGGS had seen severe complications from bubos in the hospitals. The less frequency now is due to the better treatment of gonorrheal troubles. He believed in thorough antisepsis, as the operation cannot be as safe without these precautions.

DR. H. L. NICHOLS had not recently seen a case of gonorrheal bubo, but had usually succeeded in aborting them. The operation mentioned by the author, if skilfully performed, is a good one.

DR. HANNA, in replying, said the object of the operation was to remove the glands before they broke down, and in order to do this safely, every antiseptic precaution should be observed.

American Medical Association.—DR. J. H. PARKINSON, a delegate from the Society to the American Medical Association, reported that he had attended the meeting at Milwaukee, which had been an exceedingly successful one. The next meeting of the Association would be held in San Francisco, after an absence of 23 years. That occasion was the only one on which a meeting had been held in the west, and the visit of the Association was mainly due to the efforts of the late Thos. M. Logan, a member of this society, and subsequently president of the National organization. The speaker said he had met a number of the older members who had attended the San Francisco meeting, and all were anxious to come again. Other western cities had, from time to time, attempted to induce the Association to visit them and had failed. He hoped that the next meeting would prove so successful that, in the near future, meetings would more frequently be held west of Chicago.

SAN FRANCISCO COUNTY MEDICAL SOCIETY.

Regular Meeting, July 11, 1893.

The President, H. H. HART, M. D., in the Chair.

New Members.—The following were duly elected members of the Society: E. E. KELLY, M. D., D. MORRIS HARVEY, M. D., J. F. DILLON, M. D., T. F.

BRENNAN, M. D., J. P. RICHARDSON, M. D., F. L. BOSQUI, M. D., C. E. COOPER, M. D., H. O. HOWITT, M. D., and F. W. VOWINCKEL, M. D.

DR. W. F. MCNUTT gave an exhibition of some interesting pathological specimens, the results of operations for carcinoma and epithelioma. One of the specimens shown was a teratoma removed from the region of the right kidney of a child 12 years of age. Microscopical examination of the tumor by Dr. D. W. Montgomery showed skin, containing hairs, covering most of the tumor, also bone and cartilage. It was a *fetus in fetu* originally, and could not be considered a dermoid cyst.

DR. J. ROSENSTIRN thought that morbus Addisonii might be an explanation of the cause of this tumor in that particular region.

Multiple Fibroma.—DR. ROSENSTIRN presented a case of multiple fibroma, that had already been shown to the Society, to prove the theory that the sweat glands atrophy and lose their function. He had injected pilocarpine and found that no sweating occurred on the skin over the fatty tumors. The speaker also exhibited, under the microscope, a specimen of carcinoma from a case shown to the Society March 14, 1893. It was confirmatory of his previous diagnosis of carcinoma of the liver.

CALIFORNIA ACADEMY OF MEDICINE.

Regular Meeting, June 17, 1893.

The President, LUKE ROBINSON, M. D., in the Chair.

Unilocular Hydrocele of the Neck—Spermatic Cyst.—DR. DUDLEY TAIT exhibited two cases. He said they are simple, though rare, both being the result of embryonic anomalies. The first is an unilocular hydrocele of the neck. The most important features are: (1) Its slow evolution, it having taken 15 years to attain the size of one's fist. (2) Its peculiar course, commencing in the inferior external triangle it ranged down, under the clavicle, covered by the pectoral fascia, to the axilla. The diagnosis was lymphadenoma, as it closely simulated that condition. An incision was made, and it was found to be a cyst, adhering very closely to the axillary vessels. The cyst was removed up to the clavicle, this bone preventing further progress with the operation. The wound was closed and healed. About a month ago signs of suppuration appeared, pointing in the axilla. I cut down in the old cicatrix, curetted the cavity, and now, as you see [patient exhibited], a few old granulations remain. The next case is a similar one, an encysted hydrocele, or as the French call it a spermatic cyst. As to the cause, most authors say that it is due to the persistence of the wolffian body and a subsequent rupture of a seminal duct. Nearly every observer would take it for a hydrocele, but it is not. First, it is not pyriform, nor regular in outline, and the testicle is not in that position found in hydrocele. It is somewhat translucent, not much however. The liquid that it contains is whitish and opalescent, and microscopical examination shows spermatozoids. The diagonosis at first is simple, as we can then isolate the testicle; after a time, however, when the sac covers the entire testicle there is considerable difficulty in determining its nature. He believed that in the several cases reported of spermatozoids in the tunica vaginalis there had been a mistake in diagnosis.

DR. F. W. D'EVELYN read a paper on "Myxedema and its Treatment."

DR. D. W. MONTGOMERY, in opening the discussion, said: Bramwell thinks that the cases reported as having followed *la grippe* were not acute cases, but that the disease existed before the attack of grippe brought it more to view. He also thinks that Charcot's and Ord's cases were similar, the patient having myxedema before the grippe. The disease commences early, and usually after a severe illness is first noticed. The patient would probably not know it. I remember in Switzerland some of the stupid peasants would come into the clinic blind in one eye, and never know it till we discovered it. So long as a person is able to travel around the disease does not trouble him much. This case of Dr. D'Evelyn's occurred very slowly. In Bramwell's clinical atlas, which I have here, are shown very good plates of this disease.

DR. N. ROSENCRANTZ: While abroad I saw four cases in which extensive experiments had been tried, but without success.

DR. H. E. SANDERSON: I have seen four or five cases treated by injections of a glycerine extract of the thyroid gland. In some cases results were manifest within ten days after commencing treatment; most of them began to improve within two or three weeks. In all the cases hallucinations were often present.

Dr. Dudley Tait: This subject is of interest to surgeons. In operations for removal of the thyroid we are somewhat afraid that myxedema may follow. If we have a cure for myxedema, it will serve to widen the field of surgery.

Dr. W. Watt Kerr: I exhibited to the Academy a couple of years ago an interesting case of myxedema and at the same time, through the courtesy of Dr. McLean, saw Dr. D'Evelyn's case. In my case all the prominent symptoms mentioned by Dr. D'Evelyn, were well marked, the dry, brittle skin, puffy face, and baldness in spots. That peculiar hebetude, eyes heavy and half closed, the words spoke in a slow, drawling manner, with a sort of blubbering expression of the lips. In the early stages there might be some difficulty in the diagnosis. We are liable to mistake it for anemia or some form of Bright's disease; and we are now beginning to think that nephritis follows it. At the time the case was reported by me, nothing was known of the administration of thyroid glands. In my opinion this promises much. I have been reading an extract in the OCCIDENTAL MEDICAL TIMES [vol. vii, p. 252], where Murray, of Newcastle, England, speaks of administering thyroid glands. In cases where swelling, syncope, etc., follow administration of the extract, it is more than probable it is due to the strength of the preparation; it would be indeed very hard to gauge the strength of the extract. Murray says that on the cessation of treatment, the patient is liable to a relapse. Where there is a degeneration of the thyroid, or in a surgical case involving the removal of the gland, some proportion of the thyroid would have to be given continually. The only drawback to its administration is the recent fad of preparing an extract from every gland and tissue, as cardine from heart, cerebrine from brain matter, etc., it brings ridicule on the subject. It, however, shows us that whenever we have a degenerated gland we may hope by adding to it to prolong life. The idea of expecting an extract of the heart muscle to cure affections of that organ is nonsense.

Dr. H. M. Sherman: Has any effort been made to find alkaloidal substances in the glycerine extract?

Dr. Kerr: I have hunted this up very thoroughly, but could get no definite information.

Dr. Sanderson: Have any of the cases that have been cured remained so?

Dr. D'Evelyn: It is too early yet to state positively. I have not read the article mentioned by Dr. Kerr, but common reason would teach that we cannot create a new gland to replace the one that has degenerated. It seems necessary to keep up the administration of thyroids in some form or other. In my case I gave one-sixth of the gland three times a day. During the last week I have been administering that amount during the whole day only. I remember in Edinburgh we had a typical case; there was no mental disturbance, and in my case the patient was not dull or stupid.

Dr. Kerr: There is a full account in the *Lancet* of February 4, 1893, regarding this mode of administering thyroid gland extract; it will be interesting to those who care to look it up.

Dr. Montgomery: In a case of acromegaly I endeavored to find whether or not the pituitary body was enlarged, but could not get a chance to open the skull.

Dr. Tait: At present I am treating a case of disseminated sclerosis (*sclérose en plaques*) by hypodermic injection of testicle extract; the tremor has diminished, and the general condition of the patient seems to be improving. The care given in preparing these extracts should be very great, especially in the process of filtering under high pressure (20 to 30 atmospheres). The extracts made in accordance with the indications published by Brown-Séquard and D'Arsonval are decidedly the most reliable. He believed the subcutaneous method of treatment far more active and accurate than the administration by the mouth. He had found the composition of the different extracts varied greatly.

Dr. Montgomery: Sclerosis gets better on anything. Tell the patient he is better and he often is. One case I remember got along well on electricity, but in all it is only a temporary betterment.

DR. KERR: Some may when suspension or hanging is practised; it only acts as a stimulant, we cannot get regeneration of the nerves.

DR. MONTGOMERY: In one case here, the head was opened then the abdomen, finally the patient was stretched by the heels. In the Tyrol one case was benefited by running out in the snow.

DR. KERR: I have observed several cases where testicle juice was employed. In one case the patient did not know of its use, but felt much improved. Clinton E. Worden & Co.[1] supply spermine and are also making extracts of pancreas and thyroid.

AMERICAN MEDICAL ASSOCIATION.

Officers of Sections—1893-1894.—Surgery and Anatomy—J. B. Roberts, Philadelphia,, Chairman; F. W. McRae, Atlanta, Georgia, Secretary.

Practice of Medicine—H. A. Hare, Philadelphia, Chairman; W. H. Washburn, Milwaukee, Secretary.

Obstetrics and Diseases of Women—Joseph Eastman, Indianapolis, Chairman; George I. McKelway, Philadelphia, Secretary.

Neurology and Medical Jurisprudence—J. G. Kiernan, Chicago, Chairman; Frank P. Norbury, Jacksonville, Ill., Secretary.

Ophthalmology—A. R. Baker, Cleveland, Ohio, Chairman; L. H. Taylor, Wilkesbarre, Pa., Secretary.

Laryngology and Otology—E. Fletcher Ingals, Chicago, Chairman; J. F. Fulton, St. Paul, Secretary.

Materia Medica and Pharmacy—Frank Woodbury, Philadelphia, Chairman; F. E. Stewart, Watkins, N. Y., Secretary.

Diseases of Children—W. S. Christopher, Chicago, Chairman; Frank A. Churchill, Chicago, Secretary.

State Medicine—George W. Stoner, U. S. Marine Hospital Service, Chairman; C. H. Sheppard, Brooklyn, Secretary.

Dermatology and Syphilography—A. H. Ohmann-Dumesnil, St. Louis, Chairman; L. F. Frank, Milwaukee, Secretary.

Physiology and Dietetics—I. N. Love, St. Louis, Chairman; E. Cutter, New York, Secretary.

Oral and Dental Surgery—W. H. Fletcher, Cincinnati, Chairman; E. S. Talbot, Chicago, Secretary.

Addresses.—Address on Medicine—C. H. Hughes, St. Louis. Address on Surgery—Ernest La Place, Philadelphia. Address on State Medicine—George H. Rohé, Catonsville, Md.

Place of Meeting.—San Francisco, Cal., first Tuesday in May.

SPECIAL CORRESPONDENCE.

PARIS.

[FROM OUR OWN CORRESPONDENT.]

A Week of Congresses.—The Surgical Congress.—The Gynecological Congress.—The Epidemic of Typhus.—La Confusion Mentale Primitive.—The Medical Students of Paris.

Easter week was one of almost tropical heat, nevertheless the Paris medical world worked hard at Congresses. The Surgical Congress opened fire and held its seventh Congress. The Gynecological Congress and that of Dermatology and Syphilis followed. The Paris and provincial medical men met at the Sorbonne in a special section of the Congress "des Sociétès Savantes."

At the Surgical Congress, M. Roux, of Lausanne, created a sensation by describing three operations for extirpating lipomas of the mesentery; in on instance he was obliged to remove a yard and a half of the intestines. Me Roux purged his patients four days after the operation. His patients on whom. he performs ovariotomy and hysterectomy, are allowed to get up 48 hours after the operation.

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[1] 214 Townsend street, San Francisco.

At the Gynecological Congress, there was an animated discussion concerning uterine curettage in septic cases following delivery. M. Ruière, of Bordeaux, sent an interesting paper on this method of treatment, and is convinced of its efficacy. M. Budin, the well-known accoucheur of Paris, and M. Gaulard, of Lille, are in favor of it in some cases, when all other means fail. M. Charpentier is an enthusiastic admirer of curettage if, after forty-eight hours, uterine injections have not removed all trouble; he practises "scraping," whether or not there is something in the uterine cavity.

The outbreak of prison typhus, with the other epidemics that the unusually hot spring weather has let loose in France, is not an indication that the sanitary arrangements are satisfactory or the service well conducted. The deplorable inertia as evidenced by certain authorities is difficult to account for. M. Leloir, at a recent meeting of the Academy of Medicine, stated that when the epidemic broke out at the Lille prison, it was notified, an inspector was sent down who said "it would be nothing," and ordered the patients meat, coffee, and a ration of brandy. This comfortable opinion proved to be so true that patient after patient was sent to Lille, Hotel Dieu Hospital. The disease has spread to such an extent that M. Netter estimates that a fifth part of France is attacked by this epidemic. The original focus was Amiens, where a charitable, but evidently uncleanly priest organized a night refuge. The insanitary condition of this refuge is incredible; the Abbe is dead of typhus and a large percentage of its habitues; others have, by tramping from locality to locality, spread the disease. Now the mischief is done, an inquiry is being carried on, and it is ascertained that typhus appeared last Christmas. The cause of this inertia on the part of those who should have bestirred themselves is difficult for an onlooker to explain. There are among French sanitarians and scientists so many capable men, that the questions: Where are they? What are they doing? naturally arises. Are they filling the posts they should have? If not, why not? What are the wheels within wheels at work here, which turns Paris into one of the most unhealthy cities in Europe, because dirt and disease are not checked by the weapons which science and even common sense place in our hands? Are nepotism and *pot-de-vin* at work here and threatening France with a sanitary crisis, as it has with a political and financial one in the recent Panama scandal? The medical and scientific world suffer enough from nepotism and chicanery to warrant the supposition that these evils are indirectly responsible for the present sanitary crisis. The custom among some to award honors and position to the proteges of their colleagues, independently of the individual worth of the candidate, because future favors, such as a vote for a seat at the *Institut*, or some other coveted distinction, cannot be refused, will, if not checked, eventually greatly injure the medical and scientific portion of the French nation. Interest and intrigue constitute a more powerful claim than undeniable merit. A striking example of this has been recently furnished by a prize which has been awarded for original research. Rumor says that the successful candidate was decided on before the names were sent in. "It was promised." The general impression is that nepotism has added to its numerous victories over justice.

Dr. Philip Chaslon has published an interesting pamphlet on "La Confusion Mentale Primitive." In order not to occupy too much of your space I will give a short resume. Those who wish to read the pamphlet *in extenso* can do so by applying to M. Gastonlice, 1 Rue Cressette, Paris. M. Chaslon considers that there exists a mental malady, generally acute, which is neither mania nor melancholia, and must be attributed to a quick and sudden exhaustion of the central nervous system (believed by recent authors to follow infection and auto-infection) and must not be confounded with degeneration. It is a form which is intermediate between psychoses and madness, accompanied with serious lesions. This mental condition often presents the characteristics of a positive malady, sleep is troubled, also nutrition and fever is present. The psychical characteristics are want of clearness in perception, confused ideas, resulting from imperfect association of ideas. Sometimes there is hallucination, also motor excitement or depression, and stupor. The emotions are frequent in a minor key, or subjected to violent changes.

Since I last wrote to you there have been fresh storms in the student world. Professor Poirier, who gained such laurels in the "Incident Salmon," was hissed at one of his lectures at the Paris Medical School. The noise and disturbance was at such a pitch, M. Poirier sat down and calmly surveyed the excited crowd of students, many of whom were in his favor, and made as much noise with their "vive Poirier" as their opponents with their hissing and manifold noises imitating animals. When the storm had partially subsided, M. Poirier asked, "What are your grievances; tell them and I will answer." So many men speaking together prevented any understanding being arrived at, nevertheless M. Poirier gave his lecture. When completed he told his hearers to tell their friends who had sent them there to make a noise, that their attempt had failed, and that he should regularly deliver his lecture at the usual hour. M. Gariel is regularly twice in the year hissed and greeted with "Conspirez Gariel." M. Gariel is the Professor of Physical Science at the Paris Medical Faculty, and is considered by the students to be severe at the examinations. The reasons that brought M. Poirier into disgrace with the medical students are quite of another order. Strangely enough he is accused of showing *trop de zéle*. He interests himself very much in all his pupils, and is always ready to give them advice. This is resented by some who consider he wants to acquire too much influence over them and walk in the steps of M. Lavisoe, a Professor of literature, a splendid orator, with most insinuating manners, who is worshiped by some and hated by others; the medical students object to a medical Lavisoe, and therefore noisily showed their distaste towards Professor Poirier.

PARIS, June 25, 1803.

REVIEWS AND NOTICES.

LESSONS IN PHYSICAL DIAGNOSIS. By Alfred L. Loomis, M. D., LL. D., Professor of the Practice of Medicine and Pathology in the University of the City of New York. Tenth Edition, Revised and Enlarged. Illustrations, some in colors. New York: William Wood & Company. pp. 240. Extra muslin, price, $3.00.

This book has always been recognized as a classic, a reputation which has survived its early appearance at a time when the number of good works on physical diagnosis was limited. The present volume engenders adverse criticism for three reasons, viz.: inaccuracy, incompletion, and ambiguity. One can, without difficulty, detect flaws of the nature just described, throughout the entire work. On page 1, physical diagnosis is defined as "those methods which are employed for detecting disease during life by the anatomical changes which it has produced." Surely there are a number of cardiac affections without apparent anatomical change, which are detected by the methods of physical diagnosis. On the same page, mention is made of methods of physical diagnosis other than auscultation and percussion which seldom furnish positive evidence of disease, a statement which, in its restricted application, is capable of immediate annihilation. The incompleteness of this book is characterized by its failure to mention certain modern methods of diagnosis, and by its brevity in alluding to other methods, which are nothing but definitions. Brevity in statement is no doubt responsible for equivocal interpretation. Here are characteristic sentences on page 259: "The axillary temperature when it exceeds 108° F. may probably exclude fever." "A temperature of 107° F. indicates malignancy." Most of the illustrations are original and instructive.

FERMENTATION, INFECTION, AND IMMUNITY; A NEW THEORY OF THESE PROCESSES. By J. W. McLaughlin, M. D., Austin, Texas. Austin: Eugene von Boeckmann. pp. 240.

This little volume is devoted to an elaboration of the author's theory, that many important phenomena of fermentation, infection, and immunization are traceable to certain physical laws relating to atomic and molecular vibrations in unvarying and distinctive periods of time in matter. While giving prominence to his own theory, in argumentation which is not only ingenious but brilliant, he does not slight our usually accepted knowledge of infectious diseases. A perusal of this work will prove both instructive and entertaining.

HANDBOOK OF MATERIA MEDICA, PHARMACY AND THERAPEUTICS, INCLUDING THE PHYSIOLOGICAL ACTION OF DRUGS, THE SPECIAL THERAPEU-

TICS OF DISEASE, OFFICIAL AND PRACTICAL PHARMACY, AND MINUTE DIRECTIONS FOR PRESCRIPTION WRITING. By Sam'l O. L. Potter, M. A., M. D., M. R. C. P. Lond., Professor of the Theory and Practice of Medicine in the Cooper Medical College, San Francisco, Visiting Physician to St. Luke's Hospital. Fourth edition, revised. Philadelphia: P. Blakiston, Son & Co. pp. 782. Cloth, $4.00.

As it is only a few months since we had the pleasure of reviewing the third edition of this work, we have little to add to what was then said beyond congratulating the author upon the increasing popularity of his handbook, which demands another edition within so short a space of time. The form of the book has been retained, the chief difference between this and former editions consisting in the descriptions of some of the newer remedies whose therapeutic values have been more definitely ascertained within the last year. While the whole text has been revised, we regret to see such a long list of *errata*, especially as some of the errors have been perpetuated from the former edition, but it is fortunate that few if any of these typographical mistakes are of importance. The modern features of the work, together with its admirable arrangement, will continue to make it a popular text-book.

THE DISEASES OF THE NERVOUS SYSTEM; A TEXT-BOOK FOR PHYSICIANS AND STUDENTS. By Dr. Ludwig Hirt, Professor at the University of Breslau. Translated, with permission of the author, by August Hoch, M. D., assisted by Frank R. Smith, M. A. (Cantab.), M. D., Assistant Physician to the Johns Hopkins Hospital, with an introduction by William Osler, M. D., F. R. C. P., Professor of Medicine in the Johns Hopkins University, etc., with 178 illustrations. New York: D. Appleton & Co. pp. xvi—684.

If the writer of this admirable treatise is desirous of finding an excuse for adding another text-book on nervous diseases to the considerable array that already exists, he can refer with pride to his large number of interesting and original illustrations. The illustrations alone signalize the originality of the book. Add to this a graphic description of the anatomy and symptomatology of the various diseases, and we have an ideal text-book on nervous diseases for students and physicians.

THE ELEMENTS OF HUMAN PHYSIOLOGY. By Ernest H. Starling, M. D., M. R. C. P., Joint Lecturer on Physiology at Guy's Hospital, London. 100 Illustrations. Philadelphia: P. Blakiston, Son & Co. pp. 436. Cloth, $2.

If the author has erred in the compilation of this little book, it is in the choice of the superscription; for it contains in terse language not only the elements but the more complex phenomena of physiology. True, there are more voluminous works on the subject than the one before us, but the former are adapted to institutions of learning, where physiology can be made an elective study. In this country the unnecessary brevity of the curricula in our medical colleges make the study of physiology subordinate to other courses, and the recognition of this deplorable fact renders a good compendium a necessity which amply justifies the issue of the present volume.

A PRACTICAL TREATISE ON MATERIA MEDICA AND THERAPEUTICS, WITH ESPECIAL REFERENCE TO THE CLINICAL APPLICATION OF DRUGS. By John V. Shoemaker, A. M., M. D., Professor of Materia Medica, Pharmacology, Therapeutics, and Clinical Medicine, and Clinical Professor of Diseases of the Skin in the Medico-Chirurgical College of Philadelphia; Physician to the Medico-Chirurgical Hospital, etc. Second edition, revised. In two royal octavo volumes. Volume I, 353 pages: Devoted to Pharmacy, General Pharmacology, and Therapeutics and Remedial Agents not properly classed with Drugs. Volume II, 680 pages: An Independent Volume upon Drugs. Philadelphia: The F. A. Davis Company, Publishers. Volume I, Cloth, $2.50 net; Sheep, $3.25 net. Volume II, Cloth, $3.50 net; Sheep, $4.50 net.

In this work we have descriptions of many therapeutic methods which are not included in the general text-books on the subject. Among these are hypnotism and suggestion, the influence of light and darkness, the influence of music, all of which have been brought into prominence recently in the treatment of diseases of the nervous system. A concise account of each method is given, and thus much information is furnished which cannot be obtained in any other single work. The section on drugs has also been revised and enlarged by the addition of a description of nearly all the recent remedies, but it could be still further improved by providing more ample instructions regarding the best methods of administration. The treatise is one of the most complete that has been published, and would be more popular as a text-book if it were published in one instead of two volumes.

PSYCHOPATHIA SEXUALIS, WITH ESPECIAL REFERENCE TO CONTRARY SEXUAL INSTINCT. A MEDICO-LEGAL STUDY. By Dr. R. von Krafft-Ebing, Professor of Psychiatry and Neurology, University of Vienna. Authorized translation of the seventh, enlarged and revised, German edition. By Charles Gilbert Chaddock, M. D., Professor of Nervous and Mental Diseases, Marion-Sims College of Medicine, St. Louis. Philadelphia: The F. A. Davis Company. pp. 436. Extra cloth, $3.00; sheep, $4.00.

The subject of sexual perversion or contrary sexual instinct, is one of which the profession knows but little except in a vague and indefinite way. That abnormal impulses exist, every practitioner of experience is well aware, but to differentiate between those cases that are merely vicious and those that are the result of a diseased nervous system, amenable to treatment or hopelessly gone wrong, is impossible with the limited observation that occurs in everyday practice. Krafft-Ebing, as an alienist, has had a wider field of observation than falls to the lot of most authorities, and he has availed himself of this rich experience in classifying and arranging an exceedingly difficult subject. The theme is repulsive and disgusting, but the vicious and morbid conditions exist, and the profession is certainly lacking in any comprehensive knowledge of it. The propriety of issuing such a work, or rather in putting in print such a circumstantial mass of malodorous facts as are here arrayed, will of course be questioned. Assuming that the book is intended only for medical eyes, this objection is really groundless, and while this volume is more likely to be sought by the victim of laciviousness than other purely medical works, we yet believe that its perusal will have a salutary rather than a harmful influence. The best justification of the work is to be found in the truism with which the preface opens: "Very few ever fully appreciate the powerful influence which sexuality exercises over feeling, thought, and conduct, even in the individual and in society." The subject has been thoroughly discussed without any attempt at shrinking from its repulsiveness; cases innumerable have been cited in illustration of the various phases presented, and the whole has been arranged in the most systematic and comprehensive manner. In the original, the author gives some of the most repulsive cases in Latin, with a view of preventing the possible lay reader from dwelling on their purient aspect. This idea has been followed in the translation and is, we believe, a mistake, in a book intended only for professional readers, all of whom are, unfortunately, not classical scholars. The volume really represents the best, and one of the very few books that treat of a subject of growing importance. The appearance of this excellent translation should, therefore, be marked by the hearty approval of physicians in need of reliable authority in cases presenting the profoundest difficulty in diagnosis and classification.

BOOK ON THE PHYSICIAN HIMSELF, AND THINGS THAT CONCERN HIS REPUTATION AND SUCCESS. By D. W. Cathell, M. D. Tenth Edition. Thoroughly revised, enlarged and rewritten. Philadelphia: The F. A. Davis Co.; pp. 348. Extra cloth, $2.00.

That a book can reach a tenth edition, is at least a reason for its existence, and we believe there are few books of greater value to the student, and to the physician beginning his professional life, than the volume before us. Full of practical hints, every-day experience and sound common sense, there are few who cannot learn from its pages. The physician of years and of experience will recognize many a fact with which he has long been familiar, or error that he has learned to avoid; while the beginner will see therein faithfully depicted some of the stumbling blocks that he has already encountered. While somewhat enlarged, the book preserves its original conciseness, and the additions that have been made increase its usefulness.

MEDICAL NEWS.

Official List of Changes in the Stations and Duties of Officers serving in the Medical Department of the U. S. Army (Division of the Pacific), from June 20, 1893, to July 20, 1893.

Major James P. Kimball, Surgeon, is relieved from duty at Fort Clark, Texas, to take effect at the expiration of his present sick leave of absence, and ordered to Fort Marcy, New Mexico, for duty.

The leave of absence granted Major Washington Matthews, Surgeon, U. S. Army, is extended one month.

Captain Mearns, upon being relieved from duty at Fort Clark, Texas, will proceed to Nogales, Arizona, and report to the senior member of the commission appointed for the location and making of the boundry between Mexico and the United States, for duty with the commission.

ITEMS.

Dr. R. A. McLean has removed his offices from Merchant and Montgomery streets to No. 305 Kearney street, corner of Bush, San Francisco.

American Electro-Therapeutic Association.—The third annual meeting of the American Electro-Therapeutic Association will be held in Chicago, September 12th, 13th and 14th, at Appollo Hall, Central Music Hall Block. Members of the medical profession interested in Electro-Therapeutics are cordially invited to attend. For further information, address Margaret A. Cleaves, Secretary, Chicago, Ill.

Pan-American Medical Congress. *Committee of Arrangements, Washimgton, D. C.*—Samuel S. Adams, M. D., Chairman; J. R. Wellington, M. D., Secretary; G. L. Magruder, M. D., Treasurer.

Executive Committeee—Dr. Samuel S. Adams, Chairman; Surgeon-Generals, Geo. M. Sternberg, U. S. A.; J. Rufus Tryon, U. N.; Walter Wyman, U. S. M. H. S., Drs. S. C. Busey, G. Wythe Cook, Carl H. A. Kleinschmidt, H. L. E. Johnson, Llewellyn Eliot, H. H. Barker, C. W. Richardson, W. Sinclair Bowen, Geo. S. Ober, G. L. Magruder, J. R. Wellington, and John R. Walton, D. D. S.

Sub-Committees: *Reception.*—Dr. S. C Busey, Chairman; Surgeon-Generals, Geo. M. Sternberg, U. S. A.; J. Rufus Tryon, U. S. N.; Walter Wyman, U. S. M. H. S.; Drs. J. Ford Thompson, Charles Hagner, Louis Mackall, J. Taber Johnson, T. Morris Murray, G. Byrd Harrison, and Jos. H. Bryan.

Entertainments.—Dr. G. Wythe Cook, Chairman; Drs. G. N. Acker and Thos. E. McArdle.

Registration.—Dr. Carl H. A. Kleinschmidt, Chairman; Drs. John S. McLain and Johnson Eliot.

Railroads.—Dr. H. L. E. Johnson, Chairman; Drs. E. L. Tompkins and J. Foster Scott.

Printing.—Dr. Llwellyn Eliot, Chairman; Drs. Thomas N. Vincent and F. B. Bishop.

Halls and Exhibits.—Dr. H. H. Barker, Chairman; Dr. J. T. Winter and C. M. Buchanan.

Ways and Means.—Dr. C. W. Richardson, Chairman; Drs. John Van Rensselaer, Wm. Dillenback, Henry B. Deale, and Wm. Compton.

Information.—Dr. W. Sinclair Bowen, Chairman; Drs. E. Oliver Belt and F. S. Nash.

Hotels.—Dr. Geo. S. Ober, Chairman; Drs. Wm. E. Handy and D. O. Leech.

The Pan-American Medical Congress Excursion to Rome.—It has been definitely determined that the Pan-American Medical Congress excursion to the XI International Medical Congress will sail on the S. S. "Werra" from New York, September 9th, the day following the adjournment of the Congress at Washington, and will arrive at Genoa, September 20th, four days before the opening of the Rome meeting. Round trip steamer tickets may be procured for $142.50 for inside rooms, and $150.00 and upwards for outside rooms. Tickets are good for members of the Congress and their families and may be used at option of holder to return on any steamer of the line from Genoa, or on Saturday steamers from Bremen, or Sunday steamers from Southampton, during the months of October, November and December. Physicians desiring to avail themselves of this exceptionally low rate should at once become members of the Pan-American Medical Congress by sending the registration fee ($10.00) to the Treasurer, Dr. A. M. Owen, Evansville, Ind., and informing the Secretary-General, Dr. Chas. A. L. Reed, Cincinnati, of their intention to join the excursion. Passage should be secured without delay, as the trip, involving as it will a stop at the Azores and Gibraltar and a sixty hour's sail along the picturesque coasts of Spain, France and Italy promises to be very popular. Many prominent European guests of the Pan-American Congress will return on this occasion. The time allowed will afford American physicians an opportunity to not only attend the International Congress and visit Rome, but to extend their journey to the famous sanatoria of South France and the Riviera.

Occidental Medical Times.

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THE HISTORY OF THE MOVEMENT IN FAVOR OF PURE WATER FOR SACRAMENTO AND ITS PRESENT STATUS.

By G. L. Simmons, M. D.

In nearly all cities and towns, whenever a change of the source of supply from bad to good water has been effected, such change has been originated and ultimately carried out, largely through the influence and active co-operation of medical practitioners. The reason is obvious, for it is well said that "no one can appreciate the value of wholesome water like the Doctor, for daily and hourly he must witness the baneful influence of an impure supply." Our own Sacramento is no exception to the rule, as the first to call public attention to the excellent character of the particular water supply just outside of the city limits were physicians. Almost twenty years ago the late Dr. T. M. Logan, the founder of our State and local Boards of Health, studied this subject and predicted that from this source our citizens would obtain the best of potable water.

Dr. H. W. Harkness, now the President of the California Academy of Sciences, was also deeply interested and fully indorsed the character of the supply. Dr. F. W. Hatch, about the same time, made an exhaustive examination bf the water, and urged upon our citizens the desirability of changing their source of supply from the river. As Secretary for a long time of the State Board of Health he endeavored by legal resources to prevent the contamination of the river through privy drainage; but failing in this he placed upon record his emphatic indorsement of the views of Drs. Logan and Harkness. A little later the medical profession, as a body, had the subject for discussion, and after an exhaustive examination they unanimously agreed to recommend the use of artesian water. It will thus be seen that the project to change our supply is an old one. It has not been forced upon the attention of citizens with undue haste, and its advocates have calmly awaited the gradual conversion of intelligent voters.

The later efforts to change our water supply began with the organization of the Improvement Association in 1887. From this body a committee of responsible citizens devoted much time to the whole subject. They not only had the water from this belt carefully examined by the chemist Eitel, but experimented with the amount of supply for hours, without lowering the height of the water. In their report, favoring a change of supply, they say: "Divested of all chemical terms, Eitel finds the water to be pure, wholesome, and good. It is not quite so soft as the Sacramento river water, but the degree between the two is very small. It is clear and cool, pleasant to the taste, and refreshing to the eye. With water clear as crystal at all our hotels, in all our houses, used in sprinkling our streets and spraying our trees and flowers, we would find that the opinion such a change would work in the minds of visitors would be alone worth the price of the experiment."

Two years later a second committee from the Improvement Association began its labors upon the same subject. This committee was aided by the advice of an eminent hydraulic engineer, and together they reported most favorably upon the nature of the water and the amount of flow. As a bacteriological examination of this water had never been properly made by eminent authority, Dr. T. M. Mouser was employed to carefully examine a specimen and compare it with our river water, and also the Spring Valley water of San Francisco. His report, as sent to me, by numbers, is as follows:

No. 1. (Sacramento hydrant water) developed in 46 hours, 8,100 colonies from three drops of water.

No. 2. (Deep well water from margin of city) developed, after 72 hours, only 50 colonies.

No. 3. (Spring Valley hydrant water) developed, after 72 hours, 130 colonies.

This should settle the question of the superiority of the artesian water.

In December, 1891, another Citizens Committee began to agitate the question of the needs of the city for a new water supply, and they employed Prof. Rising, of the State University, to make a chemical analysis of the water procured from the deep wells on our eastern border. His report is as follows:

	Parts in 1,000,000.	Grs. per gallon.
Total solid residue	169.00	9.88
Total after ignition	128.00	7.48
Chlorine	9.50	0.55
Free ammonia	0.02	
Albuminoid ammonia	0.05	

The above tests indicate a water well adapted for domestic use.

W. B. Rising, State Analyst.

In a letter accompanying the report, Mr. Rising says: "The results of the analysis indicate a remarkably pure water and well adapted for a town or city supply."

This is, I believe, the last analysis made of the water it is proposed to bring into our city, and emphasizes the conclusions of others known to be competent in this department of science.

Inquiry is often made, why is the clear water of the Sacramento river, which occurs in the early fall of the year, more unhealthy than the muddy flow of the winter and spring? The answer is, that during the latter seasons the water carries large amounts of débris, which, in depositing, takes with it a certain quantity of organic matter. When the higher sources of the river are low, the debris is not washed into the streams and yet the main flow receives the drainage from sinks and privies of the towns above us, and in addition, the solutions of putrefying vegetable plants, which grow in enormous quantities in the immense tule basins, and which drain into the river.

But, says our oldest inhabitant, admitting that pollution does occur a few miles above us, "Is there not such a thing as flow purification?" The answer is emphatically *No*. That idea has long ago been proven to be incorrect, and in this relation I may quote the following from the report of the New York State Board of Health: "Contrary to popular belief flow purification has no foundation in fact, and any stream which is defiled with putrescent animal matter, such as is derived from human beings, cannot safely be employed as a source of potable water supply."

With this large amount of evidence in favor of a new and clear water supply we may well be amazed at the fact that any intelligent citizen should oppose the proposition, and yet it must be admitted that some honest people are content with the turbid water of the river, and do oppose the introduction of the artesian supply. Their action is but a reproduction of what has occurred in every city where a beneficial change has been made. It is a fact that whenever a certain kind of water has been regularly drunk for a length of time, it engenders a love for its taste and other sensible properties. How often have we been told by strangers of their disgust at seeing Sacramentans drink of the muddy flow from our faucets, and yet in spite of these remarks the habit is a common one. A generation has been accustomed to drinking and bathing in the yellow-colored waters of the Sacramento, and it is but natural that some of these should still cling to the use of the unclean fluid.

In connection with this branch of our subject, it may have some influence to copy an oft quoted illustration: When the government (at the suggestion of leading physicians who had noticed the ill effects from the use of certain waters) first began to examine the exact nature of all the waters furnished to the inhabitants of the great city of London, one of its most noted wells was found by chemical analysis to contain a large amount of albuminoid matters. As the water from this particular well had enjoyed for many years a great reputation for its supposed purity—sweet taste and sparkling properties—a general protest went up from its crowd of drinkers against government investigation of its character, but in spite of this opposition the health officer, Dr. Lankester, set a force of men at work to make a deep excavation alongside of the well, when lo! an abandoned graveyard was uncovered, and the fact was indisputable that the people had been drinking solutions of their long deceased ancestors with more than ordinary relish.

THE HISTORY OF OUR PRESENT WATER SUPPLY AND THE NECESSITY FOR ITS IMPROVEMENT.

By H. L. Nichols, M. D., Health Officer, Sacramento, Cal.

Pure water is absolutely necessary for the health and comfort of the people of any community. It should be transparent, without color, smell, or unpleasant taste, and not liable to spontaneous change —in fact, beyond suspicion of any contamination whatever.

In early days the people of this city depended, mainly, upon shallow wells for a supply of water for household purposes. Its appearance was good, and taste fair, but it was found to be unhealthful. The river, at that time, was comparatively free from contamination and furnished a very good quality of water, at times, however, presenting a turbid appearance, from the effects of mining. A few grains of alum, however, would readily precipitate the earthy matter, leaving a clear, good tasting fluid. Pumps and tanks were erected near the river bank just north of I street, by private parties, and a limited amount of river water procured, which was furnished to owners of water carts and distributed to parties requiring it. This was found to be an improvement upon the well water, but the supply was quite insufficient.

In 1853 the city authorities concluded to erect works of its own and furnish river water to all who desired. Bonds to the extent of $300,000 were issued, from the proceeds of which the building on Front and I streets was built, tanks and pumps erected, and pipes laid. Upon the completion of these works the city was well supplied with good river water.

At the end of five years, the pumps, which were of rather a rude character, had become badly worn and unsuitable for the requirements of the city's wants, and, in 1858, a large and complete Worthington pump was placed in position, the tanks enlarged, more mains laid, and the city was in possession of a very complete and satisfactory system of water supply. The supply pipe was extended near to the middle of the river, from whence the tanks were filled, the water was allowed to settle, and then distributed through the city in a very acceptable form.

In this way was the water furnished till 1873, when, the city having increased in population, her needs required a larger quantity of water, and, at a great expense, the Holly system, of forcing water directly into the mains, was introduced. This method furnishes an abundant supply, but the character of the water is not desirable. It contains many impurities. The means and sources of pollution have greatly increased and, with the present method of pumping, the dangers from the use of river water, without boiling or filtering, are to be viewed with apprehension. If we can, from any source, procure for the use of the city an ample supply of pure, agreeable, healthful water, it will add to the health and comfort of our people, and any effort made, in good faith, to that end should meet the approval of our citizens.

THE NECESSITY OF AN IMPROVED WATER SUPPLY FOR SACRAMENTO FROM A SANITARY STANDPOINT.

By W. R. CLUNESS, M. D., San Francisco, Cal.

Throughout my 30 years' residence at Sacramento I was constantly impressed with the importance of this subject, from the fact that the water supply for all purposes is drawn from the river, after receiving the sewage of all the towns in the valley above. With the increase in population the danger is ever increasing, and long since steps should have been taken to obtain a supply from a purer source. No doubt the most serious and well founded impeachment of our city's water is the fact that the sewage of the Folsom penitentiary is discharged into the American river only 20 miles above. This alone should be enough to settle the question, without taking into account all the other sources of contamination higher up.

It is but justice to the medical men of Sacramento to state here that the subject of its water supply engaged their earnest attention more than 25 years ago. The records show that the dangers were then clearly recognized; but, for reasons not necessary now to recall, the warnings were unheeded. Though it might be supposed, reasoning in the usual way, that physicians would be the last, as a class or as individuals, to recommend such public measures as conduce to public health and the decrease of disease, observation abundantly proves that they are foremost, and too often alone, in advocating sanitary improvements. Such is the spirit animating our studies, such the discipline of our calling, such the daily practice of our art, always subordinating self to the common good.

It would be but a reiteration of a familiar proposition that impure water is chargeable chiefly, if not solely, with the production of cholera and typhoid fever, and this alone should decide the present question of a better supply for Sacramento. But more is to be said. Actual researches, made by scientific methods, have proved that the subtle malarial poison abounds in the natural waters of malarial localities, and have well nigh proved that through this channel, more than through the air we breathe, this poison enters the system.

In a paper read at the last meeting of the American Public Health Association, Dr. Charles Smart, of the U. S. Army, states that he found impurity of the water supply at Fort Bridger, Wyoming, always coexisting with prevalence of bilious remittent fevers. The station has an elevation of 7,000 feet; there are no marshes near, and the stream running through has high banks and a rapid current; but at certain seasons the water abounded in organic impurities. His account of Fort Brown, Texas, is more circumstantial and striking. Up to 1891 it had the ill repute of being the most unhealthy military post in the country, due without doubt partly to proximity on the north to a filthy town, to a marsh on the east, and a lagoon on the south. The two latter receive the sewage of the town and of the fort, and are undrained most of the year. During the unhealthy period the troops used the water of the Rio Grande for drinking and other purposes, but in 1891 an ice machine was sent to the post, to which was attached a coil of rope for distilling water. Thenceforth the troops drank distilled water, but the other conditions remained as before.

Previously, the cases of sickness among the troops annually had been as high as 187.8 to the thousand, and on an average 38.58 per 1,000 were unfit for duty. After the change in drinking water these numbers were reduced the first year to 32.591 and 8.32, respectively. Sickness from malarial fevers was reduced to a little more than one-fourth of its previous prevalence, and instead of remaining the most malarious post, it took the position of eighth in that respect.

Malarial diseases figure largely—much too largely—in the constant experience of the inhabitants and the daily practice of the physicians of our city. Recent studies in the nature of malaria indicate that no considerable improvement can be expected as long as people are compelled to use a water, foul with organic impurities.

Fortunately a pure source of supply, ample for present and prospective needs, and available without any engineering difficulties, exists within a few miles of the city. The cost will be insignificant in comparison with the benefits. It must never be forgotten that "public health is public wealth;" and that the prosperity of a community is correctly measured by the time which people can devote to active industries.

Speaking as a sanitarian, I close with the declaration that the tolerance of preventable disease is a crime deserving impeachment of the responsible parties, if they can be found and reached. In this case the people are responsible, and are paying the penalty by physical suffering and pecuniary losses, which are equivalent to a heavy fine. In these words of warning I hope to exonerate myself from my own share of the responsibility, and trust they will not be altogether fruitless.

THE DANGERS AND THE COST OF A POLLUTED WATER SUPPLY.

By W. A. BRIGGS, M. D., Sacramento, Cal.

Cholera and typhoid fever are the great water-borne diseases among which epidemic dysentery is likely to be included in the near future. All of these diseases depend on specific germs that are propagated in immense numbers in the intestines, whence they are discharged by the bowel passages. If not destroyed, these germs may find their way into the water supply, where, under suitable conditions, they may and often do multiply indefinitely. Taken into the stomach in drinking water, they again produce the original disease, again multiply in immense numbers and again find their way into the water-supply. Infected water is unquestionably the most frequent if not the almost exclusive means of conveying these diseases.

On the Merrimac river are situated the cities of Lawrence, Lowell and Haverhill. Lawrence and Lowell, taking their water supply from the river, have a death rate from typhoid fever of about 1:1000 while Haverhill, taking water from a different source, but otherwise similarly situated, has a death rate of less than half as much. During the year 1887, on the Ohio river, from Bellaire to its mouth, a distance of over 800 miles, nearly every town obtaining its water supply from the river was infected with typhoid fever and microscopical examination of the river water demonstrated the presence of typhoid bacilli. The only logical inference is that the bacilli found in the water were the cause of the fever.

In the year 1885, the town of Plymouth, Pa., with a population of 8,000, was in part supplied with water from a reservoir fed by a mountain stream. In a cottage, 60 or 80 feet from this stream, during the months of January, February and March, a man was ill with typhoid fever, and his evacuations were thrown out on the snow toward the stream. In the latter part of March, while the man was yet ill with the fever and having numerous and copious discharges daily, there was a heavy rain which washed the typhoid discharges into the brook, whence they were carried to the reservoir and through the conduits to the inhabitants of the town. About the 10th of April, typhoid fever broke out in the town and, for a time, new cases appeared at the rate of 50 a day. In all about 1,200 people were affected and the overwhelming majority of them lived in the part of town receiving water from the infected reservoir. Such instances could be multiplied indefinitely. They abound in the records of medicine. They have come under the personal observation of the great majority of experienced medical men, and they have led to the conviction that typhoid fever is propagated almost exclusively by infected drinking water.

"The leading authorities" says Osler, "now agree that cholera is propagated chiefly by the contamination of drinking water, of water used for drinking, washing and cooking. It is quite possible that articles of food may be contaminated, particularly vegetables, such as lettuces and cresses, which have been washed in infected water; but this is probably a minor danger in comparison with impure drinking water. The bacilli under suitable circumstances may develop to some extent in water. Koch, as is well known, found the bacilli in a tank in India, from which the inhabitants were supplied with water for drinking and washing. Strongly in favor of this view is the fact that the virulence of an epidemic in any region is generally in direct proportion to the imperfection of its water supply. On the other hand with improvement and perfection of the waterworks of a place, the epidemics are reduced in intensity, and the place may even obtain immunity from the disease. Not only in India has the connection between drinking water and cholera been furnished, but in England there have been many valuable illustrations."

The cholera epidemic at Hamburg last year furnished a recent and striking instance of the correctness of these views. For our present purposes it is unnecessary to dwell on this aspect of the question. It is sufficient to indicate that cholera and typhoid fever, and probably epidemic dysentery, are propagated by specific germs which are conveyed from the ill to the well by means of drinking water. In other words, as I have already stated, they are the great water-borne diseases.

As might be naturally inferred, rivers are peculiarly exposed to contamination with the germs of these diseases. They are the great natural sewers. The sewage of cities, towns, hamlets and isolated dwellings finds its way either naturally or artificially into their channels and spreads infection broadcast. This may be true of rivers in general, but, it may be said, it does not apply to the Sacramento. On the contrary, it does undoubtedly apply, and in one respect with peculiar force. Notwithstanding the statutes to the contrary, notwithstanding its own interest in maintaining the purity of the river water by example as well as precept, Sacramento pumps its sewage directly into the Sacramento river. With this disregard of law and of the rights and health and lives of those below us on the river, what can we expect of those above? Just the same disregard of our rights, health and lives. The sewage of the towns above us finds its way into the Sacramento as ours does. In this respect, then, the Sacramento is not different from other rivers. Like other rivers, it receives the drainage and sewage of its contiguous territory. But it is peculiar in this: in winter it empties or stores its surplus waters in immense reservoirs, known as tule basins. Luxuriant vegetation covers these basins, dies down annually and decays, and large herds of cattle and other stock pasture there and leave their excreta on the surface. The waters thus stored become a rich infusion of decaying vegetation and animal excreta, and soon reach and maintain a temperature extremely favorable to the multiplication of micro-organisms. Should these waters become infected, they become at once a source of danger. As the river falls, it drains these reservoirs and becomes in the highest degree unsavory and, besides its own inherent unwholesomeness, affords the best possible breeding place for the germs of cholera and typhoid fever. These are the "suitable conditions" to which I have already referred.

But, as suggested by the title of this paper, impure drinking water has another aspect—it is not only dangerous, but also expensive. Since November 1, 1892, we have had in Sacramento not less than four or five hundred cases of typhoid fever. Each of these cases represents a loss in time, in services of nurse and physician and in medicine, of not less than one hundred dollars. To say nothing of deaths; then, the present epidemic of typhoid fever has cost the people of Sacramento, in round numbers, $50,000—enough to pay for more than a year's supply of water, under the proposed contract with Mr. Fish.

The limits of this paper forbid the further consideration of this phase of the subject. It is sufficient to inquire what would be the cost to Sacramento of an epidemic of cholera, and to express the hope that on the 26th of August her people will determine to trust to their imagination, rather than to experience, for a solution of this question.

THE NECESSITY OF A PURE WATER SUPPLY IN THE CONDUCT OF HOSPITALS AND PUBLIC INSTITUTIONS.

By T. W. HUNTINGTON, M. D., Surgeon, Southern Pacific Company's Hospital, Sacramento, Cal.

In determining the location of hospitals, asylums, reformatories, and penal institutions, the most essential requirement is an adequate supply of clear, pure water. This is a matter that is paramount to all others. Unfortunate climatic conditions or topographical faults can be met or obviated in most instances by scientific measures; but no locality can be regarded as adapted to such enterprises, if the water supply be known to be deficient in quantity or in any manner contaminated or subject to contamination.

The general subject of the relation of the water supply to public health, and its bearing upon endemic and epidemic outbreaks of disease, has been often and thoroughly canvassed. Recent investigations have proven beyond doubt that an isolated case of typhoid fever or cholera has, by impregnation of watercourses, imperilled the lives of communities. Hence in institutions devoted to the well-being of large numbers of inmates, all subject to the same conditions and exposures, it is apparent that the utmost caution should be exercised in securing absolute immunity from any disease-breeding element.

Nor is it alone from the standpoint of drinking and cooking water that this source of possible danger should be carefully scrutinized. The risks to human life may be in plumbing choked by gradual deposits of filth in discharge pipes, in the implantation of germs in the crevices of floors, in bedding and clothing, and exposure in bathing.

Upon no class of persons are the exactions for absolutely pure water more imperative than the modern surgeon in the treatment of open wounds. Asepticity, which means the highest possible standard of cleanliness, is the first and most positive requirement in dealing with this class of work, and to bring in contact with exposed tissues a fluid that is known to contain a certain proportion of organic matter, is little short of criminal. While it is true that by careful manipulation impure water may be rendered innocuous, yet how much more perfect immunity from danger there is in absence of pollution in the original material.

Eleven years' experience in a large hospital in Sacramento has confirmed me in the belief that the usefulness and efficiency of that institution will be greatly enhanced by the relief to be obtained by an abandonment of river water, and the substitution for it of such a supply as lies within reach in the gravel beds on the eastern border of the city.

THE IMPORTANCE OF BACTERIOLOGY IN THE ANALYSIS OF DRINKING WATER.

By S. M. MOUSER, M. D., San Francisco, Cal.

In dealing with the subject of water for domestic purposes, I shall do so entirely from a bacteriological standpoint.

In the first place, all water from natural sources contains bacteria. Ice which has been procured from the purest lakes is never entirely free from them, and large numbers have been obtained from melted hail-stones and from rain water. Surface water and that from open streams, as a rule, contain greater numbers than water from any other source, especially where exposed to contamination by sewage, human dejecta and many other sources likely to prevail on the banks of streams. Deep wells and springs coming from long distances and not subject to surface contamination are, bacteriologically, purer than any other. There are certain conditions necessary to the growth and thrift of bacteria which vary greatly in different situations. All require a certain amount of moisture, also pabulum, which they find on the banks of streams and in moist places, rather than where the surface of the ground is dry and exposed to the direct rays of the sun. They vary, according to the species, in the selection of their environments, but the above will, as a rule, apply, perhaps, to a majority.

The conditions of their growth having been complied with, we come to their migration, and how they are most likely to reach the sources of our water supply. In the first place, the tendency is to gravitate, and it is only in dry weather and in considerable currents of air that they are carried to any great elevation above the surface of the ground.[1]

On the banks of streams the tendency is constantly towards the water, and, in alluvial soil, to sink until they meet with some obstruction or reach water. In the latter case, some (being consumers of oxygen) may perish when they get beyond that necessity to their existence. Sluggish streams and stagnant water favor their development more than swift currents.

Some years ago I made, at the request of Dr. G. L. Simmons, of Sacramento, a bacteriological analysis of several specimens of water, from the Sacramento river and from some wells east of the city. The result, which is appended, shows that the well water was comparatively free from micro-organisms.

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[1] Many of your pioneer citizens will remember that in the early days of California every rancher erected a pole 20 or 30 feet high, and, with halyards, suspended his fresh meat, where it was beyond the reach of the microbe and was preserved indefinitely. None of us then knew just why, but every one knew the fact.

No. 1 (Sacramento hydrant water) developed, in 46 hours, 8,100 colonies from three drops of water.

No. 2 (deep well water from margin of city) developed, after 72 hours, only 50 colonies.

No. 3 (Spring Valley hydrant water) developed, after 72 hours, 130 colonies.

If my memory is not at fault, I think that in that section south of Sutter's Fort, there is a "hard-pan" underlying the surface, almost impervious to water itself, and one of the best filters that you could possibly have against surface contaminations.

Of course it is not always the number of microbes to the cubic centimetre that determines its potability. As the kind of organism has much to do with its good or bad quality, water containing from two to three hundred microbes to the cubic centimetre, should not be condemned unless some of them were known to be pathogenic. Fortunately the dangerous variety is much less likely to prevail (away from known sources of pollution) than those of a less harmless nature.

To determine the particular species, involves an immense amount of time and patience, but if necessary it can be done.

THE SUITABILITY OF THE PROPOSED WATER SUPPLY FOR MANUFACTURING PURPOSES.

By H. J. SMALL, Superintendent of Motive Power and Machinery Department (Pacific System), Southern Pacific Company, Sacramento, Cal.

Having been requested to answer the question, "Is the water to be furnished Sacramento under the new system suitable for manufacturing purposes?" I will reply, so far as the use of the water in steam boilers is concerned:

The conclusions arrived at in this statement are deduced from facts obtained in same manner as prevails in our railroad practice, as follows: When water is required in any locality on the system, test wells are sunk and samples of the water forwarded to the laboratory at the Sacramento shops, where a careful analysis is made to determine the effects of the water on steam boilers; the result of the analysis decides the location or abandonment of water stations. A sample of the water in question was obtained from a well on the Clark ranch and submitted to Mr. Howard Stillman, Engineer of Tests, who reported as follows:

"The following is an analysis of water from the Clark ranch well, east of Sacramento. Depth of well, 102 feet; artesian supply rising within twelve feet of ground surface.

	Grains per U. S. gallon.
Total solids	20.82
Combined as follows :	
Calcium carbonate (lime salts)	4.43
Calcium sulphate (lime salts)	.64
Calcium chloride (lime salts)	.82
Magnesium carbonate	2.68
Magnesium chloride	1.87
Silica	4.08
Alumina	2.27
Sodium chloride (common salt)	2.80
Sodium bi-carbonate	1.23
Organic	None
Incrustating solids	14.10
Non-incrustating solids	6.72
	20.82

Incrustating matter per 1,000 gallons	2.02 lbs.
Non-incrustating matter per 1,000 gallons	.96 lbs.

For boiler purposes the above water should be classed as "Good," as containing less than the limit—15 grains per gallon—so considered. The proportion of lime sulphate contained is quite small and the water should not form a very hard scale. It does not contain matter in sufficient quantity to produce corrosion or pitting of boiler plates and tubes.

(Signed) H. STILLMAN, Engineer of Tests.

The classification of this water is based upon a classification of lime and magnesia waters, adopted by the Association of Railroad Chemists at their meeting in Buffalo, N. Y., May, 1887, and is as follows:

Incrustating Matter.

15 grains or less per gallon	Good
15 to 20 grains per gallon	Fair
20 to 30 grains per gallon	Poor
30 to 40 grains per gallon	Bad
Over 40 grains per gallon	Very Bad

We would, therefore, not hesitate to use the Clark ranch water for our boilers, and a personal inspection of a boiler in use three years on the Clark ranch strengthens me in the belief that no ill results would be obtained from the use of this water for steam purposes. Comparing the Clark ranch water with water used by this company in other parts of the State, I find the former is far superior, as below:

Clark Ranch,	grains incrustating matter per gallon,	14.10
Benicia,	“ “ “ “ “	28.48
San Pablo,	“ “ “ “ “	14.35
Piedmont,	“ “ “ “ “	21.11
East Oakland,	“ “ “ “ “	16.89
Avon,	“ “ “ “ “	19.95
Martinez,	“ “ “ “ “	29.81
Melrose,	“ “ “ “ “	15.50

From an analysis of a sample from the Sacramento river made in

January, 1889, 11.45 grains per gallon was obtained, the sample being taken from settled water.

During the year 1888, the Southern Pacific Company prospected considerably for water in Sacramento, several test wells having been sunk north of the shops to a depth of 84 feet. Samples from these wells were analyzed by Prof. Price, of San Francisco, and found to contain 15.3 grains solid matter per gallon; the residue was composed of silica, lime, magnesia, soda, carbonic acid, sulphuric acid, and chlorine; alumina and iron largely predominating. It was condemned for boiler use. The water from these test wells was found to be the same as that obtained from a well in the shop yard which for years had supplied the shops, and which it was desired to abandon; this was finally done by drawing our supply for the shops from the Sacramento river. I mention these facts for the reason that many are familiar with the results of these tests and the character of the water obtained, probably tending to prejudice them against any water found in or about Sacramento. An examination of the analysis of the Clark ranch water—especially as to the absence of iron—will convince them that it is of an entirely different character, and that it is admissable for boiler use. Possibly had we sunk our test wells to a greater depth, we would have obtained water equally as good as the Clark ranch water.

THE FINANCIAL ASPECT OF THE PROPOSED WATER SUPPLY.

By Frank Miller, President National Bank of D. O. Mills & Co., Sacramento, Cal.; Member of Citizens' Committee of Fifteen on Water Supply.

The city having an indebtedness exceeding 15 per cent. of the assessed value of all property within the city, and having defaulted in the payment of bonds and interest, Sacramento is not in a position to get money for public improvements, except by direct taxation. This indebtedness cannot be cancelled under four or five years.

The four urgent needs of the city, in a public way, are:

1. Levee improvement.
2. A new sewerage system.
3. New waterworks.
4. A new City Hall.

While water is now under discussion, I hardly know which to consider the most important. The public mind has been constantly agitated by one or more of these questions. When we have not been in dread for the lives of prisoners confined under the water tanks in the old city prison, or anxious lest an extraordinary warm rainfall in the mountains should send down a flood of water greater than our levees could stand, we have been listening to the complaints of the citizens living south of the city, on whose land we dump our sewerage without warrant of law, or the advice of our physicians warning us to boil or filter the water that we use.

Whenever an attempt has been made to remedy any of these evils we have been met by the cold, hard fact that we cannot borrow any more money until we pay what we now owe. It must be admitted that the city has not an adequate water supply; that she has not a sufficient fire protection; that the appearance of our present water is offensive to strangers and a bar to progress.

If a more satisfactory water supply can be procured at a reasonable price without the city or its inhabitants surrendering any of the valuable advantages or rights that they now have by reason of controlling their water supply, and deriving a valuable revenue from them, it seems to me a wise thing to do. We would then be relieved of one of our great public troubles and could devote our energies to the solution of the other three, which are less expensive, but none the less important.

As I understand, the substance of the proposed plan of furnishing the city with water is for the city to buy the water at its limits in bulk, distributing and collecting for it through the same methods that it now uses, reserving the right to purchase the property at the end of a period of years. The high character of the gentlemen who labored upon the specifications under which bids were submitted would seem to me to be a guarantee that the city's interests were well protected.

While it is claimed by some that the city should do this work itself, permit me to ask how it can be done? The largest well yet developed east of the city produces 40,000 gallons of water per hour. To insure the city a safe supply during the hours of greatest consumption, on a hot July day, requires 500,000 gallons per hour. Is this city willing to expend the large amount of money necessary to put up experimental works to test the capacity of this water supply? Would any Board of Trustees assume the responsibility of the possible failure of such a test? Would the city submit to a special tax to rebuild our water system, which must be done throughout if we continue to use the present source of supply; and, considering our financial condition, would such a course be wise public policy?

In estimating the cost of the city's rebuilding its water system and continuing to derive water from the river, certain items are liable to be lost sight of; for instance: The interest on the cost of the plant; the fact that the life of any pumping machinery or boilers does not exceed twenty years, thus requiring an annual estimate of 5 per cent. of the original cost for depreciation.

Finally, let me again impress upon your attention the fact that this city cannot sell bonds or raise the quarter of million necessary to build its own works, save by a special tax.

THE LEGAL ASPECT OF THE PROPOSITION TO SUPPLY SACRAMENTO WITH PURE WATER.

By ROBERT T. DEVLIN, Attorney at Law, Sacramento, Cal.

The legal points involved in the proposition to supply Sacramento with water, now under consideration, are so few that I do not know that anything I can say will give much satisfaction. The question is one principally of business policy for the city. So far as the status of the question is concerned, I may say that under the city charter the Board of Trustees have power, in the language of the charter itself, "To provide for supplying the city with water, regulate the sale and distribution thereof." The Trustees have power in carrying out this provision to do any act necessary to effect the purpose. They have power to enter into a contract for any period not exceeding fifty years to supply the city with water.

The provisions of the charter relative to special elections have, in my judgment, no bearing on this question. The charter is framed on the theory that the Trustees shall not incur any indebtedness beyond the revenue of the city to meet it. If emergencies arise when it is necessary that the city should incur an indebtedness beyond the amount in the treasury, the power to create this indebtedness is vested in the people to be expressed at an election, and does not reside in the Trustees. The charter says in Section 20: "Should the Board of Trustees at any time deem it necessary for the interest and protection of the city at large, or any portion thereof, or the property or health of the citizens thereof, or any other matter or thing, the object of which would be to advance the interests of the city, to contract and create any debts or obligations against the city for materials furnished and labor services performed, without having the funds in the treasury to pay the same, the said Board may enter into contracts, create debts or obligations without interest, and are hereby empowered and authorized to levy and collect a special tax annually, or in one levy, to pay such debts and obligations so created, and provide the mode and manner of their payment; *provided*, *always*, that no debts, obligations, or claims shall be contracted against the city without first having been voted upon by the qualified electors thereof."

It is only in cases where the city desires to create an indebtedness beyond the amount of funds in the treasury that a special election is necessary. But under the proposed contract no such indebtedness will be incurred. There will always be sufficient money in the treasury to pay its bills for water, and the city will do no more than it does now in entering into contracts for supplying the city with light, or coal, or any other material for which it contracts. The coming election is simply, then, for an expression of opinion on the part of the electors of the city for the guidance of the Board of Trustees, and it does not require a two-thirds vote as would be necessary if the election were required under the provisions of the charter to authorize the creation of an indebtedness beyond the ability of the city to pay from its present resources. The Trustees have full power, if they desire, to exercise it, to enter into the proposed or a similar contract, no matter what the result of the election may be. This will be to them simply the expression of the sentiments of the people on the proposition, which they are at liberty to follow or entirely disregard, as they may choose.

If it be asked, whether it would not be better for the city to erect a plant of its own and operate it at its own expense, it may be said, that it is doubtful from a a financial standpoint that there would be any gain in so doing. Experience shows that works conducted under public authority are not operated as economically as when under private control. Between what it would cost a municipality to run a water plant and what it would cost an individual, there will be a wide margin, in itself, no inconsiderable profit. But an insuperaable objection to the city erecting a plant, is its financial condition. Its bonded indebtedness already exceeds fifteen per cent. of its taxable property, and it will be several years before the city can legally issue new bonds. The proposition of the city erecting a plant is therefore entirely out of the question, at least for several years to come. It undoubtedly would be better for every man to be his own banker, but this is impossible. He must either let his business advantages remain unused, or borrow from those who have to lend. Sacramento city must either secure its water through contract, or rest content with its present supply.

If the proposition should be favorably voted upon and a contract should be entered into, pursuant to the specifications, the legal relation that will exist between the city and contractor will simply be that of buyer and seller. The contractor will sell so much water, and the city will pay therefor an agreed price. The contractor will have no power over the rates or the distribution of water. The city will own its waterworks to as great an extent as it does now. The only difference will be that instead of paying for coal and labor to pump the water from the river, it will pay an equivalent sum to the contractor for the same result. The city will be under no legal obligation to take more than one thousand million gallons per annum, and it will always require that quantity.

The specifications that are made a part of the contract have been carefully drawn, critically scrutinized from all points of view and give the city the most ample protection on all points. Onerous conditions are imposed upon the contractor, and the city is under no obligation whatever, except to pay an agreed price for the water it uses for a stated number of years, with the privilege of becoming the owner of the plant at a price to be fixed by arbitration and to be approved at popular election. It would be almost impossible to conceive of any stipulation of advantage to the city that has not been inserted in the specifications.

THE NECESSITY OF A PURE WATER SUPPLY FROM A BUSINESS STAND-POINT.

By H. WEINSTOCK, Sacramento, Cal.; Member of Citizens' Committee of Fifteen on Water Supply.

Sacramento to-day should have had a population of 50,000. It is a natural railroad centre; it has water transportation; it is surrounded by a rich agricultural and horticultural territory and is a natural centre for trade, for shipping and for manufacture. That Sacramento to-day ranks as the fourth, instead of the second city in California, is due to a number of causes.

In spite of our natural advantages, we have had unfavorable conditions to deal with—some of which were more or less beyond control. We have had a heavy bonded debt hanging over us—as a reminder of the early fires and floods that overtook our city—that has kept our municipality poor, in spite of heavy taxes annually levied. We have had constant fears of flood staring us in the face and destroying confidence not alone among those outside of our city, but also among our own people.

We have had, and still have, a defective system of sewerage that has been charged with much responsibility for bad health. Until within recent years, we bore the unenviable reputation of having the worst streets in America—streets that in winter were almost impassable. Yet again, until recently, we labored under the very serious disadvantage of having a business quarter made hideous and unsightly by dilapidated wooden awnings, and by wooden sidewalks, whose protruding nails took an invariable delight in tripping up visiting strangers. And last, but far from least, we have had and still have a water supply that disgusts strangers by its filth, and that, during a number of months in the year, seriously frightens our own people, on account of its disease-breeding character.

When we remember all these things, the wonder is not, that Sacramento from being a few years ago the second city in California has become the fourth, but that she has grown at all. Take away the natural advantages—for which thanks are due not to our own people, but to a generous Providence—and leave us with the conditions for which our people are more or less responsible, and Sacramento to-day would have dwindled down to a mere hamlet.

The past few years have, however, shown a commendable spirit of progress among our people, that must be continued if we are to maintain our position among the sisterhood of progressive cities. Our streets have been vastly improved; our unsightly awnings are rapidly disappearing; our levees have been and are continuing to be strengthened, so as to remove all fear against possible flood; our wooden sidewalks are rapidly being replaced by cement; our sewerage system is receiving serious consideration and will doubtless in the near future be made to compare favorably with the best the country affords. And now comes an opportunity to overcome one of the most serious drawbacks to health, to the growth and to the prosperity of our city, namely, the displacement of our filthy and impure water with a clear and wholesome supply. The physicians of our city, almost as a unit, have time and again warned us that we were courting sickness and death so long as we continue the use of our present water supply.

Many of these physicians for years have forbidden the use of this water for domestic purposes in their own homes. These men have certainly nothing to gain by making such an outcry. From a purely selfish point of view it would seem to their interest to permit conditions to remain that bring them patients and that increase their earnings. Yet we see that their sense of duty prompts them to warn the people of this city that they are constantly offering themselves to those dread diseases that, as a rule, follow the taking into the system of water filled with impurities. If the river water be pure, then the physicians of Sacramento are either lunatics or ignorant knaves. If what they say is true, then how criminal and foolhardy for us to refuse to remedy so serious an evil when the remedy is within such easy reach.

Here are responsible parties that, at their own risk and expense, offer to make all the necessary experiments and to guarantee to furnish us with absolutely pure water that shall stand the test of the highest authorities in the land. Shall we, after the experience of the past winter, when over 250 cases of typhoid fever were raging throughout our city, caused, according to the statements of our leading physicians, by the use of river water; shall we, after an experience such as that, and with almost an assured certainty before us that last winter's experience will be repeated in future seasons with perhaps still more serious results; shall we, in the face of all this, reject the opportunity?

To do so would, to my mind, appear not alone unwise, but absolutely criminal. Even though we may feel that we ourselves may be able to escape the results of using river water in high-water months, when the river is filled with decaying vegetable matter, have we the right to continue risking the health and the lives of others who physically may be less fortunate?

Aside from the question of health, there is a business phase in the matter that demands our serious consideration. The Chief Engineer of our fire department warns us—and his record tells he is honest, faithful and truthful—that beyond Fifteenth street he can get little or no pressure in case of fire, and that even in the heart of the business quarter he has frequent difficulty in getting a sufficient supply of water at a pressure that will enable him to promptly control a fire. Let the Board of Underwriters once get the impression that our water supply is inefficient, and let that impression be verified by a fire made serious from want of water, and our citizens will find themselves compelled to pay more in the way of increased insurance rates in a year or two than would cover the cost of two or three new water plants and pumping outfits, if they had to be paid for at once.

"Well, why not tax ourselves at once, and put in our own well-water plant, instead of farming it out to a corporation?" I hear some one say. This would be unwise, even if practicable, because we have no money to spare in experimenting with wells, and none to lose if the experiment should fail. We cannot borrow money for a great while to come, because, under the law, we owe too much to make new bonds legal; we cannot levy a direct tax, because, with our already high tax rate, any such attempt would be defeated at the polls. And so, we must either rest content for an indefinite time with the bad water we are now forced to use, or we must do what all intelligent seekers after health and all intelligent business men and seekers after prosperity should certainly do, and that is, not alone to vote in favor of obtaining clear water, but also to see that their friends and neighbors do likewise.

THE CITY'S ASPECT OF THE PROPOSED WATER SUPPLY.

By B. U. STEINMAN, Mayor, Sacramento, Cal.

I have given the subject of the proposed new water supply for the city of Sacramento very attentive consideration since it has become a subject for investigation and discussion, and have looked at it from all points of view. I favor the proposition, and consider that the best interests of the city demand that it should be adopted. The reasons that lead me to this conclusion I shall briefly state:

In the first place, it will give us a better water supply. The specifications provide for a pressure uniformly of forty pounds to the square inch, to be increased promptly whenever a fire alarm is sounded to as high as one hundred pounds to the square inch. This, in itself, is a great gain. The uniform pressure provided for will be sufficient to run elevators by hydraulic pressure; will send the water through the pipes to the top floors of the highest buildings, and the fire pressure will enable a hydrant to do the work of a fire engine.

We gain a supply of water more healthy and wholesome. I need not dwell on the necessity of a supply of pure water to the city for the people already here, but we require a better supply as an inducement to those we expect to add to our population. On the 18th of this month I sent a demijohn filled with three gallons of this water to Prof. Rising, for the purpose of securing a complete analysis. When his report is received I shall place it before the public.

By the new system every part of the city will be supplied with water. Those portions which have in recent years been built up and settled are entitled to the same facilities for obtaining water, both for domestic purposes and for protection against fire, as the older and earlier settled parts of the city.

Now, let us look at it from the other side. Suppose, at the coming election, the proposition is voted down, what position will the city be in? If we had a perfect system at present, or if the city was in a financial condition to erect a plant of its own, the defeat of the present proposition might not be attended with disastrous circumstances. My duties as Mayor, however, have caused me to investigate our present supply and our present needs, and the facts that any citizen who looks into the matter for himself will easily learn are not generally known. If the new proposition should not be carried, and if we are to continue our present system of water-works, we absolutely need five new boilers, which will cost $10,000. We shall also be compelled to overhaul the present mains and add new ones, and the cost for this work, I estimate, will certainly not be less than $20,000. We also require new pumps with a capacity of 5,000,000 gallons, and the cost of this will be $50,000. Even when all this is done, and these expenditures are made, we will find that the building at present used is unsafe and a new building will have to be erected, and the cost of this, I think, at a low estimate, would be $40,000.

Looking at the financial aspect of the question and considering what the city will have to pay under the proposed subterranean supply, as compared with the present cost, we find that last year the cost to the city for pumping the water was $34,000, and this is not taking into consideration interest on money, or wear and tear on machinery. Under the proposition submitted to the people we shall secure all the water that we need for many years to come at a cost of $39,000 *per annum*.

The city receives from water dues a yearly income of from $90,000 to $100,000. Deduct 55 per cent. or $55,000 from this amount, which under the law must be paid to the bondholders of the city, we have left as a net income to the city the sum of $45,000. This sum is more than sufficient to meet any obligation we may be under for a supply of water, and does away with all fear of there not being sufficient money in the water fund without using the water rates or resorting to the general fund.

Another financial feature to be considered is that by the securing of a better water supply we will obtain a decrease in our insurance rates. Our present water supply is insufficient to give us protection, as was unfortunately demonstrated at recent fires.

Finally the Board of Trustees have the last voice in the matter. If the proposition carries it will simply be an expression of popular sentiment. If the water is not pure and wholesome, as determined by chemical analysis, the Board of Trustees, under the specifications, will not enter into the contract. The contractor takes all the chances, and we take none. I believe the city now has an opportunity that it would be the height of folly not to seize. If we do not accept the proposition that is under consideration we will make a mistake that will take years and the expenditure of much money to rectify.

Occidental Medical Times.

COMMUNICATIONS are invited from all parts of the world. When necessary to elucidate th text, illustrations will be furnished without cost to the author.

SACRAMENTO: AUGUST 24, 1893.

THE PROPOSED WATER SUPPLY FOR SACRAMENTO.

There are few even amongst the most conservative or the most indifferent of our citizens that deny the advisability of a water supply for this city that shall be an improvement over that we at present possess. There are, however, various opinions as to the source of the better supply and of the means that could or should be adopted for its introduction. There is at present a proposition before the people to furnish water from the gravel beds east of the city, provided this water shall be found, after exhaustive and thorough testing, to be ample in quantity, and of a quality desirable and satisfactory to the varied needs of the city. The proposition that the Trustees shall enter into a contract with the Water Company on specifications already published in the daily papers, will be submitted to the people on Saturday, August 26. Looking at the question from every aspect, its adoption seems in the highest sense important for the betterment of the city, and that she may be more fully enabled to avail herself of her natural advantages. THE MEDICAL TIMES has deemed this subject of such pre-eminent importance from a hygienic standpoint that it has been decided to issue a special number devoted exclusively to this question, in order to present to our citizens in an authoritative form the reasons that should lead them to unanimously endorse the proposed contract.

Our position on this subject is not new. In our issue of March, 1888, when discussing the need of "Pure Water and Good Sewerage" for this city, we said: "The matter of a pure water supply, with a source removed from the possibility of contamination, has been often discussed. To bring this water from a mountain reservoir and deliver it in its original purity, is out of the question, unless on the basis of some gigantic co-operative scheme. To improve the existing source of supply is impossible, just as its steady and certain deterioration year by year is inevitable. Meanwhile, there exists to the east of the city, at a distance of about one mile, what appears to be an inexhaustible supply of excellent water. It is found at a depth of 120 feet and rises to within 16 feet of the surface. In tapping this water-bearing stratum three layers of hard pan are passed, which secures it from local contamination. The expense of rendering this available is trivial, when compared with any scheme to procure mountain water, and the gain to the community from every point would be enormous."

Taking up the subject at a later date, in our issue of March, 1893, on the subject of "Clear Water for Sacramento," we said: "A proposition has been submitted to the Trustees of Sacramento offering to supply the city with clear water, obtained from the gravel beds east of the city. We are not concerned with the legal or the financial aspects of this question, except to point out two facts. The finances of the city are in such a shape that only a limited bonded indebtedness can be incurred. It is therefore by a scheme of this character only, admitting of a small annual payment as rental, that the city can accomplish anything. We need a new water supply and a system of sewerage. To issue bonds providing for both is out of the question, but the disposal of the water problem would leave the way free for the inauguration of a comprehensive and permanent system of main drainage. In considering the possible sources of a water supply for this city, there are but two that can be seriously entertained. The first, and in our judgment the most desirable, is mountain water, obtained from some source in the high Sierras, secure from contamination, and then piped the entire distance to this city. No modification of this should be considered for a moment. To convey water for the whole, or for part of the distance, in flume or ditch or natural water-way, is to expose the city to all its present disadvantages, with the certainty of a possible and far greater danger by the pollution of a very small stream. Piping mountain water to the valley is a problem of the future, only possible on the basis of a general water supply for a large and well populated area. There remains only the supply from the gravel beds, as within the limits of feasibility. This water is probably that of the American river, supplemented by the natural underground stream to be found all over this section. It is filtered through an immense filter bed, much larger than any artificial filter in existence. It is obtained at a depth of over one hundred feet, in a sparsely inhabited area. The water is clear, palatable, not hard, and chemically pure. From whatever aspect viewed, it is vastly better than our present supply, whose imperfections increase with each succeeding year. We repeat that this is the only proposition that can be countenanced by the profession, and it is also the only one that the city is financially able to adopt with the sanction of sanitary authorites.''

No one denies that the Sacramento river is being daily contaminated, nor that this contamination is increasing with each succeeding year. We have first the contaminations incidental to the passage of a river through any agricultural country in garbage, offal and dead animals, as well as the drainage from houses along its banks. There is next a not inconsiderable floating population, discharging matter of all kinds into the stream. Then the drainage from the tule basins during low water, where large amounts of animal and vegetable matter, in slow decay, awaits the annual flushing. Finally, we have the many towns along the banks of the river, and its tributaries, all contributing their quota of untreated sewage to swell the volume of impurity. We have, within twenty miles of our water works, the penitentiary at Folsom, discharging its sewage directly into the American river at all times of the year. The water at our doors must therefore contain all these impurities in a state of greater or less dilution, according to the season.

It does not require either chemical or bacteriological tests to demonstrate these facts, they are susceptible of ocular demonstration. Here it may be well to point out that, in modern medicine, chemical tests can only show the probability that a given water is contaminated. It is to bacteriology that we now look to inform us positively of the precise nature of the disease-breeding germ that is present. Water, however bad, will not produce cholera nor typhoid fever, unless the germ be present in the fluid. On the other hand, water apparently good may contain these germs in fatal numbers and wholly insusceptible to chemical tests. These facts, which are in accordance with modern science, are well shown in the analysis by Dr. Mouser that appears elsewhere.

There is an urgent need in Sacramento for an ample supply of clear water for sanitary purposes. In all parts of the city, under the average pressure, the water only reaches the upper stories of the higher buildings at certain hours of the day. In the outlying districts of the city this difficulty is met with on all floors. It is therefore often impossible to flush closets or sinks, or to insure the necessary water seal for traps that are relied upon for protection. From this standpoint, the amount of sediment in our present water supply is a great disadvantage. It encourages the accumulation of all kinds of filth in fixtures and discharge pipes, and renders the working of more delicate sanitary machinery extremely uncertain.

The water with which it is proposed to supply this city is apparently of excellent character. Chemical analysis and bacteriological tests show that it is an excellent water for domestic use. A specific analysis has also shown that it is of superior quality for manufacturing purposes, and that it can be confidently recommended for use in steam boilers. But it is not proposed that these tests shall be final, nor that the water shall be adopted until it has been demonstrated that these qualities shall not appreciably vary under constant use. The specifications on which it is proposed to base a contract are plain and straightforward. As far as can be seen they afford the city all the protection that is possible. To postpone this question by adverse vote would be a lamentable disaster. On the other hand an overwhelming expression in favor of progress will more than ever help this city in the march of improvement on which she has recently entered with such vigor.

SACRAMENTO SOCIETY FOR MEDICAL IMPROVEMENT.

Regular Meeting, August 15, 1893.

The President, F. L. ATKINSON, M. D., in the Chair.

The Water Supply of Cities.—DR. H. H. LOOK read a paper upon this subject. He said: The necessity of our larger cities having an ample and constant supply of water, has frequently led them to seek for quantity rather than quality, supposing that all waters, unless presenting some physical objection, were wholesome. Surface waters have been in the past, and will still continue to be, the main source of water supply for mankind. These are produced by the rains falling upon the earth and running off rapidly into rivers and lakes, or percolating through the soil into springs and wells. Rain-water can be taken as a standard of purity for natural waters. In its passage over the surface of the earth, it gathers those impurities which break it up into so many varieties, each partaking of the character of the soil of its water-shed. Hence the many classifications, according to the leading mineral constituent into saline, chalybeate, sulphurous, calcareous, magnesian, etc.; also according to their abstergent qualities, into hard and soft waters. Hard waters contain in solution lime carbonate and are found in the regions where that substance exists. Soft waters may contain other mineral matter so long as the lime is absent. Since all these chemical constituents are harmless to the system, it is perhaps best, for sanitary purposes, to classify waters according to their physical distribution into lake, river, spring, and well water. From these sources it is necessary for us to obtain our water supply. River water is generally that chosen for large cities, as it meets all the demands hitherto imposed upon it. The supply was never-failing, and the water coming in contact so little with the soil was free from earthy salts and was also soft in character. But another form of contamination occurs, which is far more serious, and that is sewage. From this is derived almost all the disease-producing impurities that enter water. Water contaminated with sewage is at all times unwholesome. To destroy these disease germs has been found impossible except by heat. Filtration may remove a large percentage of them, but has not proven perfectly successful. Well water, when derived from shallow wells, is also unsafe. Sipage from cesspools and privies contaminates it. Deep well water is perhaps the safest source of water supply, when it can be had in sufficient quantity. True, it contains many of the earthy salts, but as these are harmless, they can be objected to only when they render the water unpalatable. The distance the water must percolate through the earth removes all the impurities held in suspension, as clay and sand, and also offers the best means of removing and destroying the germs. A city supplied with water free from sewage contamination, need not fear an epidemic of typhoid fever or of cholera.

DR. J. R. LAINE, in opening the discussion, said: The water question is a very wide subject, and the obtaining of a satisfactory supply for a large town is a very important matter. There are but four sources of water supply for towns. These are rivers, lakes, wells and catchment water. If uncontaminated by sewers or effluents from manufactories, water from rivers may be free from objection. Large cities situated on the borders of large lakes sometimes obtain water of good quality by putting their supply pipes out far into the lake. Chicago and Milwaukee, on Lake Michigan, are well known instances, and other cities on the lower lakes do the same. Catchment water is never satisfactory, and should not be used until it has undergone an artificial filtration. Water may be obtained for public uses from both shallow and deep wells. Some superficial wells furnish an almost unlimited quantity, but their shallowness makes them very likely to become polluted, when much sickness may result from the use of the water. Wells sunk by boring through the surface measures, until they pass through fifty or sixty feet of hard clay, seems to be the best and safest source, provided the quality is suitable for domestic and other uses. This source is seemingly, if not actually, free from danger of surface contamination, on account of the imperviousness of the thick bed of clay or hard-pan which overlies the gravel and sand that holds the water. A number of cities in Nebraska and Kansas, some having double the population of Sacramento, obtain their water supply in this way, and I am informed do not suffer at all from typhoid fever or dysentery, or any of the maladies due to unwholesome or contaminated water. Deep water underlies the great plains, from the Missouri river to the Rocky mountains, a distance of 600 miles, at a depth of about 100 feet, though water from surface wells may be obtained nearly all over that vast region at from fifteen to thirty feet. The Sacramento and San Joaquin valleys have water and clay measures resembling very much those of the great plains. East of Sacramento city, wells bored to a depth of 110 feet reach water which rises to within ten or fifteen feet of the surface, and which can be diminished but a few feet by constant pumping of a steam pump. This water is clear and wholesome, and in every way more desirable than the river water in use. We may in time build aqueducts rivaling those of ancient Rome to bring water from the mountain lakes, but until that can be done we must look for a supply nearer home. I need scarcely add that I am strongly in favor of water from the deep wells east of the city, for I believe there is an unlimited quantity of better water to be obtained there than is supplied to any city in California.

Dr. C. E. Fowler: It should be to us a source of congratulation that to the medical profession almost solely is due the dissemination of knowledge in hygienic matters. This is more especially manifested at present by a general desire, on the part of the people, for a purer source of water for domestic purposes. Up to the time of the discovery that diseases of many kinds were transmitted from one individual to another, through the medium of germs of a specific character, the general idea as to the fatality of water was, that clearness was, as a rule, synonymous with wholesomeness, and that the filtering of water through soil, or by means of running streams, removed all deleterious substances. The development of the germ theory, however, demonstrated the fact that all surface water may become badly impregnated with disease germs, and scientific investigation has shown that it is through impure water that many of the most virulent diseases are disseminated. In cities of the size of Sacramento, the entire practicability of a water supply, from subterranean channels, has been demonstrated in other localities, similarly situated, and the increase in healthfulness which has invariably ensued, upon the use of such supplies, is one of the strongest arguments that can be advanced in its favor. In cities of vast population, as London, Berlin, New York, etc., the feasibility of water supply from such sources may be a matter of doubt, but where numbers in population and proper geological formation will admit of the use of water from underground channels, every effort should be made to utilize such advantages.

Dr. Thos. Ross: This subject ought to interest every citizen, as it means the prevention of disease. We do not have to depend upon surface water for our supply. In the geological formation of the Sacramento valley, so far as has yet been ascertained, we find first on the surface a deep layer of rich alluvial soil, then a stratum of gravel, in which is found water that is polluted by drainage from cesspools, vaults, and other surface filth, and the use of which for domestic purposes has been and is a pregnant source of disease. Beneath this first bed of gravel is a stratum of clay which is impervious to water. Beneath this layer of clay is a second bed of gravel, and in this is found clear, pure and wholesome water in abundance. The benefits from the use of water from the second stratum of gravel have been demonstrated in Woodland, whose source of supply comes from it at a depth of about 200 feet Previous to the use of deep subterranean water the town was subject to epidemics of typhoid fever caused by the use of surface water—water taken from the first layer of gravel—and now since the use of surface water has been abandoned, and that from deep wells substituted, Woodland rarely has a case of typhoid fever that is not imported from neighboring towns. An examination or analysis of the Woodland water made by State Analyst Rising, proved it to be good for domestic purposes, and wholesome. I am convinced that Sacramento has, in the second layer of gravel, a similar supply of pure, clear, healthful water in inexhaustible quantity. I do not believe the water from Clear Lake, Lake county, to be good for domestic purposes, because of its being a basin catching the waters of thousands of mineral springs—the overflow only escaping from the lake, and evaporation being great in summer months renders the water from year to year more impregnated with mineral substances. By the use of properly constructed wells the water underlying the stratum of impervious clay cannot become contaminated with surface water. In this locality subterranean water is more healthful than river water, because the Sacramento river is the natural sewer of the great Sacramento valley. Water furnished in quantities insufficient for cleanliness, or of a quality unfit for drinking, is acknowledged to be the great source of such diseases as typhoid fever, cholera, dysentery—filth diseases which are preventible by proper sanitary regulations.

DR. G. L. SIMMONS remembered that this important subject had been several times fully discussed before the Society during the 25 years of its existence. In truth, the very earliest efforts to call public attention to the excellent nature of the artesian supply near the city, were made by its members. As Chairman of one of the water committees, he had fully examined the subject as a citizen and as a physician, and there was no doubt in his mind of the desirability of giving up our river water for domestic use. Like all rivers, the American and Sacramento do receive the foulest offal of the communities above us. Simply diluted it enters our mains and is again distributed through the digestive tracts of our inhabitants. In addition to this pollution, we have at this season of the year, from the drainage of the great tule basins on the north, solutions of putrefying fresh water plants, which we all know increase the albuminoid ammonia and cause our present water supply to assume a dangerous receptivity for disease germs.

DR. W. A. BRIGGS: Our first cases of typhoid fever occur after the early fall rains. My observation is that the earlier the rains the earlier the development of the typhoid epidemic. Two or three epidemics, our most severe ones in the past fifteen years, I remember followed early rains—one as early as September. Is this a mere coincidence? I cannot bel eve so. The first rains wash into rivers and their mountain tributaries the accumulated excreta of the previous season. These excreta are, no doubt, often infected with the germs of typhoid fever—the so-called mountain fever and the equally miscalled typho-malarial fever. The Sacramento and its tributaries receive the superficial wash of an immense area inhabited by a large population. The town of Oroville, and other mountain towns, and numerous mining and lumber camps, and still more numerous isolated dwellings, with little or no provision for the care of sewage, permit their excretions to accumulate for six months of the year and then precipitate them on us with the early rains. This, in my opinion, is the explanation of what has hitherto seemed a mere coincidence. We have not escaped the inevitable penalty of the violation of sanitary laws. We have had thousands of cases of typhoid fever in consequence of it—since last November not fewer than four or five hundred. Similar epidemics have been observed on the Ohio river, and microscopical examination has demonstrated the presence of typhoid bacilli in the river water. We are similarly situated, and have been similarly affected, and I believe from the same cause—infection of our drinking water. Unfortunately, we have no geological survey of the Sacramento and San Joaquin valleys, and we are, therefore, obliged to rely for our knowledge of the geological formation largely on the scattered, imperfect and unrecorded data of well-borers, but from its probable geological history, and from the best information obtainable from these imperfect sources, I believe that the strata of impervious clay, whose existence is demonstrated by every boring, are continuous, not broken, and that they impose an impassable barrier to the contamination of a deeper water supply.

DR. J. H. PARKINSON said that some years ago he had investigated the sources and the extent of the pollution of the Sacramento and of the American rivers.

It was difficult, for obvious reasons, to procure the necessary data, but after some work a good deal of material was accumulated. A review of this showed the condition of things to be so bad that, as there was no prospect of immediate relief, he had deemed it unwise to publish the facts. It was undoubtedly true, as Dr. Briggs had stated, that the greatest prevalence of typhoid fever occurred after the early fall rains had swept the various impurities into the streams. In his experience, the severest epidemic had been in 1883, and this had followed an unusually heavy rainfall in October, with a subsequent dry period. The water supply of the city at present was bad, and in the nature of things must necessarily become worse with each succeeding year. The theory that running water purifies itself by distance was not a safe one to depend on. The foreign matters that reached the stream were in part consumed by the different forms of animal life, which had probably more to do with the purification than motion or sunlight. In relation to pathogenic germs, particularly those of the two water-borne diseases, cholera and enteric fever, it was quite certain that they could travel a long way in water and ultimately be found in that which was apparently of fair quality. To filter the present river water, as had been suggested, and at the same time to provide a supply adequate to the growing needs of the city, would be an exceedingly expensive undertaking, except by resort to chemicals, which was inadvisable. The filter beds would need to be quite extensive and they demanded constant attention and periodic cleansing. In the gravel beds east of the city, we had a natural filter bed of vast extent, such as it would be utterly impossible for any city to duplicate. Many cities were using subterranean water. London was in part supplied from that source, and in this country, Memphis, and, he believed, Brooklyn, were amongst the larger cities using well water. All river water was exposed to contamination, and the smaller the river the greater the danger from excessive concentration. The reason we had suffered so little in the past was that, owing to the great dilution, the dose of the poison had been exceedingly small. He could, perhaps, best express his opinion of the present water by stating that in his household the drinking water was first boiled and then filtered.

Dr. Wm. Ellery Briggs: It is a great pleasure to me to find this unanimity of sentiment in regard to the water question. When I came here fourteen years ago, the appearance of the water struck me very unfavorably, and it was with great reluctance that I got into it to take a bath. At that time, however, every one would tell me that it was the best water in the world—apparently believing what they said. Soon after I found that many of the towns above us dumped their filth into the river and I questioned the statement that a solution of slickens, sewage, and dead animals of various kinds, could make a good and wholesome drinking water. A number of years have now passed since the members of this Society began to agitate the question of improving our water supply, and the unanimous opinion of the medical profession in this city is now in favor of subterranean water. It seems to me that the fact that the medical men of this city, who know so well the unwholesomeness of the river water, are all in favor of the proposed water supply, ought to have great weight with the general public. From other than hygienic points of view, a clear, pure water supply would be a great aid to the progress of Sacramento. The river water at the present time not only looks bad, but at times its odor is absolutely offensive, and any one must become very hardened who really likes such a beverage. We must, each one of us, work energetically and convince our friends of the lasting and great benefit an improved water supply will be to the health and to the prosperity of the city.

DR. F. B. SUTLIFF: The theory that water purifies itself by flowing is not correct, though it was for a long time believed to be so. It is an easy theory to believe, as the evidence of one's eyes and nose helps out the delusion. Water grossly contaminated at a given point increases in clearness at every rod until, a few miles from the source of pollution, it may rival in brilliancy and taste the purest stream that is filtered through the hills. But we have to take into account the fact that a large amount of the contaminating matter has precipitated, and at the bed of the stream is slowly undergoing decay. That the larger particles have broken up into smaller and still smaller ones, or entered into solution; that the stream, gathering volume as it flows, granting that its tributaries are clear, becomes more dilute until its impurities are out of sight. If this dilution is great enough, water polluted with ordinary dead matter may become tolerably pure, but if the polluting element contains disease germs it can never become safe for domestic purposes. The bacteria of diseases, such as typhoid fever, belong to the vegetable kingdom, and need not be taken into the stomach in great numbers in order to reproduce their kind—to cause typhoid fever—any more than it is necessary to plant more than one grain of wheat in order to have wheat grow and bring forth wheat. I am fully aware of the fact that our book-shelves are full of books teaching that water will purify itself by flow, but they are not the books of to day. I wish that the people who are inclined to believe and teach this false creed would look a little more closely into the subject. The destruction of all organic material is by oxidation—burning, not destroying by mere solution. Disease germs are not nearly so quickly oxidized, or burned, in the water as in the sunlight and the air. Let me quote, briefly, from a very good authority in support of this view: "The English River Pollution Commission paid much attention to the claim that water becomes purified by its flow, and the result of many experimental investigations constrained its members to report that there was no river long enough in the United Kingdom to secure the oxidation and destruction of *any* sewage which might be discharged into it—*even at its source.*"

DR. G. A. WHITE: Our river water in the past has given rise to much and unfavorable comment. The water in use at the County Hospital for several years is the same as that which it is proposed to furnish the city. Many years ago Dr. Thomas M. Logan, who was then Secretary of the State Board of Health, sent samples of this water to San Francisco for analysis, and it was shown to be wholesome water. Later samples were procured from the same locality by Dr. W. A. Briggs and were reported on favorably. The supply is reached at the depth of 110 feet. The surface water in that belt was reached at fifteen or twenty feet, and there was a second water-bearing stratum at forty to sixty feet. It was, however, necessary to go to the greater depth to obtain the best water.

DR. LOOK, in replying, said: If this subterranean water can be secured without contamination from the surface it will be pure. Its watersheds are the mountains where sewage contamination is impossible, and the geological formation in the valley prevents a subsequent infection. River water is soft, for the reason it flows rapidly from the ground on which it falls, and therefore dissolving very little of the inorganic salts, and particularly lime carbonate, which determines its character. Subterranean water is better than river water, for it is free from the organic substances that are washed into the rivers, rendering it unwholesome. The earth acts as a great filter, removing the suspended matter first, and in time destroying the vital organisms. While in the Pacific Mail Steamship service I had this fact demonstrated. In Panama we procured our drinking water from a small island, situated some twenty miles out in the gulf. For purity I have never seen it excelled. In Acapulco we also filled our tanks. On leaving Panama, until reaching Acapulco, no fever would occur, except a few cases that could be traced to a previous infection. These cases would all be among the local passengers that had remained in that city for some length of time. Our New York passengers would always escape. After leaving Acapulco we always had fever among our New York list until we reached San Francisco. I could see no other reason for this than in the water supply. Both waters were from springs, both clear, and one almost absolutely pure. Both were derived in a region teeming with malaria; but I could only assign this reason, that the Panama supply came from watersheds hundreds of miles away, while that of Acapulco came from the hills that surrounded it. One removed or destroyed the germs and the other permitted many to escape. While living in Kansas typhoid fever was very prevalent in those places where the wells were shallow, but on the upland, where, in order to get water, it was necessary to go deep into a sandstone stratum, that disease rarely occurred. I am heartily in favor of the subterranean supply for this city, for I am convinced that it is the purest and most wholesome that can be gotten, not excepting the mountain lakes.

The following resolution was then unanimously adopted by the Society :

WHEREAS, The undersigned, members of the Sacramento Society for Medical Improvement, having fully discussed the feature of a new water supply for the city; and whereas, such a supply is urgently needed for hygienic and for commercial reasons; therefore, be it *Resolved*, That the Sacramento Society for Medical Improvement unanimously endorse the proposition to supply this city with water from the gravel beds east of the city, believing this supply to be pure in quality and inexhaustible in quantity. *Resolved*, That a copy of this resolution be presented to the City Trustees, and the papers of Sacramento.

⁂ The following remarks have been furnished by members not present at the meeting and to whom the abstract of the paper and the report of the discussion was submitted:

DR. H. L. NICHOLS: I agree with the author of the paper in the views presented by him. In a paper upon this subject, read before the Society in March, 1885, I thoroughly advocated the furnishing of pure water for this city, and showed the necessity for it. The reasons then given are more urgent now than at that time, as the river water is being polluted to a far greater extent. That running water in rivers of great volume purifies itself in a measure is true; still there is danger in the use of any river water which receives any considerable amount of sewage and other poisonous matter.

DR. F. R. WAGGONER: I regret I was not present at the last meeting of the Sacramento Society for Medical Improvement, being unavoidably detained; but I have had the privilege of reading the proceedings, with the very able paper of Dr. Look and discussion thereon, and I do most heartily endorse the resolution so unanimously adopted by the Society. I have been at some pains to examine the proposed clear water supply offered to the city, and find it of most excellent quality and purity, free from lime and all other earthy matter, as well as vegetable albuminoids. The slight trace of chlorine improves it in every way.